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A Monthly Popular Journal of Knowledge

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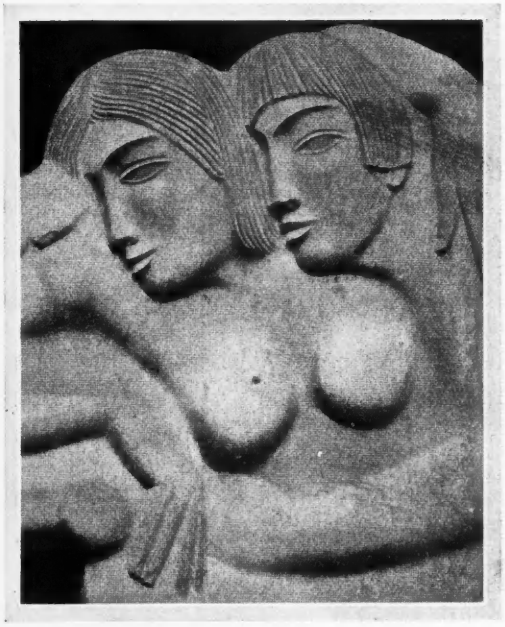

TENDENCIES IN MODERN SCULPTURE
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Notes of the Month.

The British Association's choice of Leicester as its meeting place this year recalls some of the discussions which took place when that city was last visited twenty-six years ago. The meeting of 1907 was notable in many ways. In view of recent progress in our knowledge of atomic physics it is interesting to recall a discussion on the constitution of the atom which took place in 1907, described by Silvanus Thompson in his *Life of Lord Kelvin* as one of the most instructive ever known in the Association. Among those who took part were Professor Ernest Rutherford, Sir Oliver Lodge, and Lord Kelvin, whose last public appearance this meeting was, as he died at the end of that year. As Mr. O. J. R. Howarth recalls in his book *The British Association : A Retrospect*, Kelvin's activities at Leicester, in his eighty-fourth year, brought fittingly to a close his unremitting attachment to the interests of the Association. He had proposed a vote of thanks to Sir David Gill, the President ; he had read a paper on the motions of ether produced by collision of atoms or molecules containing or not containing electrons ; and now he keenly entered into debate, holding as he did, that the atom was an indivisible unit, and therefore it could not as such be said to possess a constitution. Another important event at the Leicester meeting of 1907 was an evening discourse by William Duddell on the arc and spark in radiotelegraphy ; in this he showed experiments which laid the foundation for continuous wave telegraphy. Sir Oliver Lodge recalls his impressions of that meeting in an interesting article on another page.

* * * * *

The principal items in the sectional programmes this year are briefly reviewed in this issue. The variety of subjects to be discussed illustrates the widening scope of the British Association's activities, which is the theme of Sir Frederick Gowland Hopkins' foreward on page 267. In Section A, for instance, the discussion on the upper atmosphere has a topical interest in view of recent balloon ascents into the stratosphere. Work now in progress on the Land Utilization Survey scheme gives added interest to the discussion in Section E on the preliminary survey of land utilization in the city of Leicester. There are many other items which would not have found a place in the programme for 1907, such as a discussion in Section F on the sales problem of the technical product, and the illustration of industrial processes by slow-motion and sound films. A full report of the meeting by our own correspondent will appear in the October issue for the benefit of readers unable to attend the meeting.

* * * * *

Excavations at St. Albans on the prehistoric and Romano-British sites of Verulamium were recently resumed. After only a month's work several discoveries of interest had been made. These included a mosaic pavement of a type differing from those previously found. Apparently the prehistoric system of British origin in Prae Wood, which has now been found to extend beyond the wood for half a mile, is later than was thought. It cannot, therefore, be the city of Cassivelaunus stormed by Caesar in 54 B.C.—this probably is the recently discovered prehistoric work at Wheathampstead—but may be attributed to his successor, Tascovianus. This remarkable site is of unparalleled importance for the history of Britain at two obscure points, just before and just at the close of the Roman occupation. The results of the excavations under Dr. Mortimer Wheeler are happily to be permanently accessible to the public. The Corporation of St. Albans has decided to maintain Verulamium as an exhibition with a museum of finds

on the site, while H.M. Office of Works is preserving the South Tower of the second Roman city as an ancient monument, to show the system of defence approximately in its original condition.

* * * * *

Over two square miles were occupied by the exhibits at the National Radio Exhibition, Olympia, last month, which was the largest show of its kind ever held. Many novel exhibits were on view for the first time, including "the set of the future," visualized by the Marconiphone Company as a possibility for 1960: the listener merely asks for the stations he requires and he is automatically switched on — which should appeal to those who disapprove of "knobs" and gadgets generally. The machines manufacturing high tension batteries attracted attention; the raw materials pass in at one end of the machine, and the completed batteries appear at the other. There was general disappointment at the absence of a television demonstration, but much interest was shown in the latest vision receivers on show. On the stand of our contemporary *Television* was a specially designed mirror-drum receiver giving an image measuring nine inches by four inches; and the latest Baird "televisor" was exhibited by the manufacturers, while the Edison Swan Electric Company demonstrated a cathode ray tube which is thought by experts to have great possibilities for the future. There are still many problems to be overcome before television can give an entertainment equal to that offered by modern radio; and in the meantime several experimenters are turning to the televising of films which, if it has not the imaginative appeal of "pure television," is a simpler matter and gives a clearer image. Television has been inclined to run before it can walk, and it will be as well to concentrate on a simpler form of entertainment until some of the existing problems are overcome.

* * * * *

Television has an obvious link with talking pictures if a simple method of combining the two can be found. A system proposed by two American inventors (and with characteristic enterprise called "Beyond Television") seems a trifle too ingenious to be quite convincing. They explain that reels of film would be distributed each week to subscribers possessing a home cinema as well as a wireless receiver. The sound would be broadcast from the studio and the film simultaneously run through the home cinema; the film would stop automatically when announcements were to be made. A cinema projector would also be installed in the studio so that the artists might time their speech to synchronize with the movements of the film. We hope that the problem will be solved in a simpler way than this, which mildly suggests the art of Mr. Heath Robinson.

* * * * *

A new theory, to which he gives the name of the "thirty-fifty man," is advanced by Sir Ernest Benn in a book entitled *This Soft Age*. In searching for an explanation of the weakness as he sees it in modern life, especially in public affairs, the author finds that the shortage of men between thirty and fifty years of age since the war has corresponded with the stages of the economic depression, year by year, to a striking degree. It is suggested that the real work of the world falls on those in this category, and statistics show that 1933 is the first post-war year in which the population contains a normal proportion of men of thirty who are completely free from the handicaps suffered by those who went through the 1914-1918 period. The book will be published on September 14th.

OUR TRAVEL COMPETITION

Entries for the *Discovery* Travel Competition, announced in our June issue, dealt with readers' experiences in many parts of the world. Prizes were offered for the best essays describing a journey in England or abroad, preference being given to entries illustrated by photographs or sketches. The first prize to the value of £20 is awarded by the Editor to Dr. P. L. Giuseppi, of "Trevose," Felixstowe, whose essay appears on page 283 this month. The second prize (£5) goes to Mr. H. Z. Collier, of London Road, Marks Tey, Essex, whose article is printed on page 292. Consolation prizes (£2 10s. 0d. each) are awarded to Mrs. J. E. Salisbury, of 85, Avondale Road, North Southport, and Mr. William Donkin, of 7, Carlyle Mansions, Cheyne Walk, London, S.W.3, whose essays describing travel in India and the Sahara, will be published later. The Editor of *Discovery* wishes to thank all those who entered for the competition, which it is hoped to repeat next summer.

The Widening Influence of the British Association.

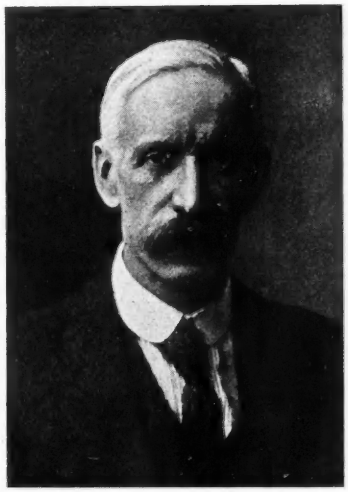
By Sir Frederick Gowland Hopkins.

President of the British Association for the Advancement of Science, 1933.

In our British Association number we are again privileged to publish a foreword by the President. Sir Frederick Gowland Hopkins looks back on the period which has elapsed since the Association last met in Leicester and shows how its activities have widened to keep pace with the progress of science in recent years.

THE British Association returns to Leicester after an interval of twenty-six years, a period covering a fourth of its history. The return suggests a comparison of its activities during that interval with those of earlier years.

Anyone interested in the history of modern science who can find occasional leisure to turn successive pages of that long series of reports which record the Association's continuous labours cannot fail to discover that they tell a great story exceptionally well. They yield an impression quite different from that obtained on reading an ordinary survey of progress written *ad hoc*. For while they illustrate the steady growth of science through a century, and record the occasional announcement of the unexpected and sensational, they also make the history vivid by recording words personally spoken, and conjure up a background on which personalities stand out.



Sir F. Gowland Hopkins.

Those who have not the leisure to find a pathway through the reports will be grateful to that active and distinguished member of the Association, Sir Oliver Lodge, its President in the year before the war and always its friend and supporter, for the book* which records his memories of many meetings. For the period covered in that book we have something even better to read than the reports themselves; but the memoirs extend from 1870 to the end of the last century only, and so do not reach the first Leicester meeting. All who are familiar with the Association's work since it was last in that city, whether by personal experience or by reading, know that in the interval its activities have shown no abatement, that its standards are as high as ever, and that, because of the progress of science, its interests have widened.

That an institution of its kind when a century old should maintain all the vigour of youth, and show promise of a long sustained future could at no point of time in its history have been taken for granted. Even its founders in their enthusiasm could not have felt an assurance of such a future. The Association was ridiculed in its early days; it has faced the antagonisms which, from time to time, the progress of science has evoked; financially, though of late years it has received generous gifts, it may be said to have lived long from hand to mouth; it has no imposing central home to emphasize its corporate existence, though its organization calls for much centralized work. Yet in spite of the growth of specialized scientific societies, and the competition of congresses of all sorts, it has started its second century with undiminished influence. It seems almost necessary to seek special reasons for such an outcome.

In the first place the Association has maintained its influence less as a corporate body than as the tangible garment, so to speak, of an inspiring spirit. In particular its ideals have been such as to evoke the devoted services of a long succession of officers and councillors, whose labours have passed during the years from willing hands to hands equally willing. It has maintained standards such that none can fail to feel the honour attached to the occupancy of its Presidential chair, and each President of a section realizes that he must bring of his best to its meetings. The tradition and conduct of its assemblies and its consequent reputation have been such that it has never lacked spontaneous offers of hospitality, or failed to find generous local support in the centres it visits. As in the case of Leicester it is often invited to come again. Lastly, it has traditional attention from the lay Press which, when reporters refrain from invention and exaggeration, greatly helps popular appreciation of scientific progress.

**Advancing Science*, by SIR OLIVER LODGE (Benn, 1932).

Reminiscences of Leicester in 1907.

By Sir Oliver Lodge.

The Leicester meeting of the British Association in 1907 was notable for the addresses devoted to physics and astronomy. Sir Oliver Lodge recalls his impressions of the meeting, in which he took a prominent part, and mentions the advances made in our knowledge during the past twenty-six years.

A PERIOD of twenty-six years has elapsed since the British Association first visited the city of Leicester. It was in 1907 that the meeting took place, at a time when Leicester had no University College and was less developed in the scientific direction than it is now. It is interesting to look back to the period of 1907 and think of the advances science has made in that time.

Early Theories.

The President chosen for that year was Sir David Gill, the famous astronomer of the Southern hemisphere, where he did a good deal to counteract what has been spoken of as the lopsidedness of the data available for discussing theories of the universe, and whose work is still often cited in connexion with modern discoveries in astronomical measurement. In his address at Leicester Sir David dealt mainly with the constitution of the cosmos and the discoveries that were then beginning to be made about the stars, especially concerning their proper motions and the stellar distribution at different distances from the sun. It was before the time when much attention was given to the spiral nebulae. The principal researches appealed to were those of Kapteyn, who had recently made the discovery that the stars on the average divided themselves into two groups travelling in opposite directions with reference to the sun, the appearance being as if we were in the midst of two great groups of stars rushing past each other in opposite directions, each star having its own irregular motion, but having superposed upon it a tendency or drift in one direction; like two swarms of bees, which might be thought of as interpenetrating one another and passing through each other, while each bee flew about irregularly irrespective of the drift of the swarm.

It was found also that the stars differed enormously in luminosity, so that taking them in a sphere whose radius is 560 light-years, that is down to about the ninth magnitude, there would be :

1	star	giving	more	than	10,000	times the light of the sun
20	stars	,,	,,		1,000	,, ,, ,,
1,300	,,	,,	,,		100	,, ,, ,,
22,000	,,	,,	,,		10	,, ,, ,,
140,000	,,	,,	,,		1	,, ,, ,,
430,000	,,	,,	,,		0.1	,, ,, ,,
650,000	,,	,,	,,		0.01	,, ,, ,,

This assumes that space is perfectly transparent, or that light does not suffer any extinction in its passage through interstellar space: an assumption which is now modified in certain directions by the discovery of some opaque absorbent masses.

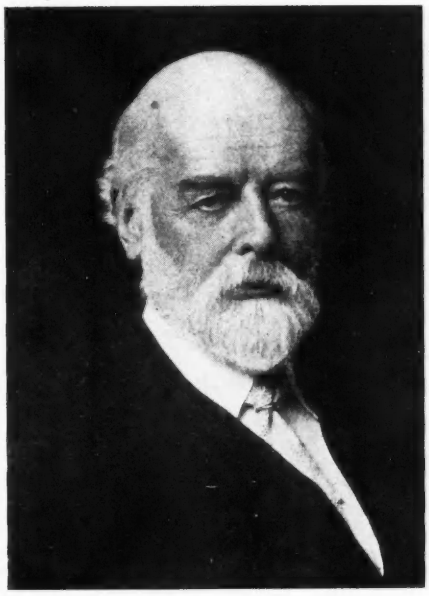
This star-streaming is now known to be mainly an appearance due, not to two independent groups of stars passing each other, but to the rotation of a single group or galaxy of which the sun is a member. The rotation is about a centre at a considerable distance from the sun, while the governing force of the rotation is the gravitational attraction of the entire mass, so that those nearer the centre will on the average be travelling faster than those further off. If, therefore, we consider the sun as stationary, the other stars would divide themselves into two groups, travelling or appearing to travel in opposite directions, giving an appearance of two opposite star streams produced by the rotation of a single great cluster. The galaxy or Milky Way has an angular velocity as a whole which would make the stars near the sun complete a revolution in a time corresponding to the geological age of the earth.

The Milky Way.

This remarkable idea of the rotation of the whole Milky Way, and the consequences that follow from it, have been explained by Sir Arthur Eddington in his Halley Lecture on "The Rotation of the Galaxy," delivered in 1930. He shows that a great cluster of stars could only be stable if they were in rotation, and that it is this which keeps the whole system from collapsing. The speed of the sun is estimated at about 200 miles a second, which enormous velocity would by those who took it as their standard of reference be attributed to other bodies, especially to those independent galaxies which are observable in enormous numbers, and which likewise are seen to be in a state of rotation. These nebulae are all found to be receding from us, some of the more distant with very great speed. Some of the nearer ones, like the Andromeda nebula, were at first thought to be an exception to the general rule of recession, but it is now perceived that their apparent approach to us is merely a consequence of our own velocity towards them. Allowing for this, it would appear that all the spiral nebulae

are really rushing away from us and from each other; though our own absolute speed is unknown, and possibly, according to the Theory of Relativity, unmeaning.

But we must return to Sir David Gill speaking in the City of Leicester in 1907. In addition to the Kapteyn processions and other stellar matters, he speaks of determining the great unit in astronomy, the Solar Parallax, and of a new method of measuring it, depending on some of the minor planets at a time when they come near the earth. He had predicted in 1877 that the old transit of Venus method could not be made more than indefinite, and that some minor planet would furnish a better method. In 1931 Eros, he now said, would be approaching the earth within one-sixth part of the sun's mean distance, and would give a means of determining the Solar Parallax within one ten-thousandth part of its amount, and suggested that it was already time in 1907 for them to begin preparations for the observations in 1931.



Sir Oliver Lodge

The organization of this work was begun and carried through by a Committee of the International Astronomical Union, under the Chairmanship of Dr. H. Spencer Jones, the new Astronomer-Royal. The observations in 1931 were made at 32 observatories and are recorded in the Transactions of the International Astronomical Union, observations made in Southern observatories being specially important; but no discussion of the measurements is yet available, nor can anything be yet said about the results. The work is continuing under the supervision of Dr. Spencer Jones, who at first had succeeded Sir David Gill in his control of the observatory at the Cape. Suffice it to say that the warning of Sir David when President at Leicester has not been overlooked.

Another reference was made by Sir David to the measurement of the Arc of the Meridian, which he had already begun in sections, passing through different countries in Africa. It was being measured in metres, but that might have no meaning for posterity, unless the metre was defined in terms of the wave-length of light. And it so happens that in another part of the 1907 volume there is a great report of wave-lengths, measured in dry air at 15°C. and 760 mm., by different observers: the record occupies 154 pages of the volume.

In Section A, the President, Professor A. E. H. Love, gave a discourse on the shape of the solid earth, that is of the earth if the sea were removed, and showed how it could be expressed approximately by a series of spherical harmonics superposed upon each other. After this address, Lord Kelvin gave a paper in which he upheld the elastic solid theory of the ether for about the last time. Its title was "On the Motions of Ether Produced by Collision of Atoms or Molecules." It was followed by a discussion on the constitution of the atom by Professor Rutherford, to which Lord Kelvin and others contributed. But it was in the pre-Bohr days, and very little was certainly known about the constitution of the atom and of the mode in which atomic electrons produced radiation. The Quantum indeed has been promulgated, and Planck's theory of black-body radiation had been suggested, and in fact his law is quoted in a paper on "Optical Pyrometry" on page 441. But of the mechanism of atomic constitution and electronic radiation we were still completely in the dark; and the discussion has left no permanent trace on my memory. No doubt this discussion had some effect in stirring interest in the subject, but we must wait till 1913 before Rutherford's astronomical model of the atom, with a nucleus at the centre and satellites revolving round it in orbits stabilized by the quantum, was shown by Bohr to be competent to explain the line-spectrum of the radiation emitted in every detail.

All this was elaborated, together with a calculation of Rydberg's Constant in a paper of remarkable insight and exactitude by Professor Bohr in the "Phil. Mag." for July 1913. Since then there has been further progress, with a tendency to supersede Bohr and discredit his orbits, because of new-fangled methods of expression and minutiae—which after all is the fate of pioneers in science when its progress is rapid by reason of the multitude of workers attracted

to the work by the success of the pioneer. The supersession is welcomed by the worker in science, to whom it is obvious that his advance, however striking, can be but a stepping-stone to something beyond, and never a final goal. But the brilliant work of Professor Bohr, now established in a laboratory at Copenhagen, in deciphering the intricacies of the series of spectra emitted by incadescent atoms, has been influential and indispensable in determining the constitution of atoms. In this connexion it may be well to read the address of Professor Smithells, the President of Section B, and note his observations on the relations between science and philosophy, and on the introduction of mathematics into chemistry, and the attitude of chemists to atomic hypotheses in general.

At the conclusion of the Leicester volume there is a summary of the Evening Discourses, one being by Duddell on "The Arc and the Spark in Radio-Telegraphy," in which he mentions the method of Tuning, and illustrates it by a model, and also speaks of the beginning of wireless telephony, rendered possible by the utilization of the continuous waves emitted by a transmitting arc. This paper is rather instructive now when we consider the developments attained at the present time by the B.B.C.

Finally I will mention a communication of my own which is recorded on page 452 of the Leicester volume as a sequal to one published in the April "Phil. Mag." the same year, its title being "On the Density of the Ether of Space." In this paper I abandon Lord Kelvin's theory of an elastic solid, and seek for a return to his other suggested treatment of the Ether as a fluid with a kinematic kind of elasticity. This paper has not yet attracted attention, and there is some idea current that the Ether itself is an unnecessary hypothesis rendered obsolete by the Theory of Relativity. But while accepting the main portions of the Theory of Relativity, I still adhere to the arguments of this paper and to the kind of experiments therein suggested, and still call attention to the need for an Ether to weld the whole cosmos together into a single whole. The Ether is wanted for electromagnetic waves; gravitation cannot be explained without it; it is needed for the strength of materials and for all potential energy; and in fact is essential to an understanding of the universe as a whole as propounded in my book, "My Philosophy."

Sectional Meetings at Leicester.

LEICESTER received its first meeting of the British Association in 1907, when Sir David Gill, the astronomer, was President, and the occasion was notable as the last on which Lord Kelvin attended and addressed the Association of which he had long been an active supporter. The city's staple industries are, of course, the manufactures of hosiery, boots and shoes. But in many other directions it invites the interests of the Association in regard to the applications of science to industry, as well as to the social well-being of the inhabitants. Nor is it wanting in memorials of its past history, from the time of the Roman occupation onward. It possesses an active Literary and Philosophical Society, established in 1835, with headquarters in the Leicester Museum, which was founded upon the collection presented in 1849 to the town by the society itself. Leicester is also a centre from which localities of interest to chemists, geologists and mineralogists, agriculturists and botanists, economists, archæologists and others may be readily visited.

Leicester received its modern charter as a city in 1919. Its University College was established in 1921. It became the seat of a bishopric in 1927. Thus its advancement has been great since the date of the previous meeting of the Association; moreover, progress has been made also in the architectural improvement and planning of the city, and fine modern buildings now available are amply sufficient for the requirements of the Association, which were met not without difficulty twenty-six years ago.

The inaugural general meeting will take place at 8.30 p.m., on Wednesday evening, September 6th, when Sir Frederick Gowland Hopkins will deliver an address dealing with the chemical aspects of life. Evening discourses will be delivered on September 8th and September 11th, by Sir Josiah Stamp, General Treasurer of the Association, on a subject in economic science, and by Professor Jocelyn F. Thorpe on the work of the "Safety in Mines" Research Board.

A reception will be held by the Lord Mayor and Lady Mayoress of Leicester in the De Montfort Hall on September 7th, and a garden party will be given by University College on September 11th. An excursion to the Lower Palæozoic Rocks of the Welsh borderlands is contemplated by Section C (Geology) to take place under the general direction of Professor W. W. Watts, from September 1st to 6th.

The sections of the Association will begin their sessions on September 7th, and will continue daily

(except Saturday) during the Meeting. Among the principal items in the sectional programmes the following are announced :—

The presidential address in Section A (Mathematics and Physical Sciences) will be given by Sir Gilbert T. Walker on " Seasonal Weather and its Prediction." Sir Gilbert has been Professor of Meteorology in the Imperial College of Science since 1924. He was Senior Wrangler at Cambridge in 1899, and was Director-General of Indian Observatories from 1904 till 1924.

Professor R. Robinson will deliver the presidential lecture in Section B (Chemistry) on " Natural Colouring Matters." He has occupied the Waynflete chair of Chemistry at Oxford since 1930, and has been Professor of Organic Chemistry in the Universities of Sydney, New South Wales, Liverpool, St. Andrew's, and London.

The presidential address in Section C (Geology) will be delivered by Professor W. G. Fearnsides on " The Structures of Some British Coal Fields." He has been Professor of Geology in the University of Sheffield since 1913. Dr. Fearnsides was a member of the council of the Geological Society, 1913-17 and 1925-30, has been Vice-President of the Midland Institute of Mining Engineers since 1928, and has published many papers dealing with the Lower Palæozoic rocks of North Wales, Scandinavia, Ireland, and with the geology of the south-east Pennine coalfield.

In Section D (Zoology) the presidential address will be given by Dr. J. Gray on " The Mechanical View of Life." He is a reader in experimental zoology at Cambridge, and has published many papers on this subject. Among topics for discussion in this section are : the X-ray analysis of fibres, and the past history of the earth.

Lord Meston is the president this year of Section E (Geography). He was Rede Lecturer at Cambridge in 1920, and Chancellor of Aberdeen University in 1928 ; and among the many appointments Lord Meston has held are Adviser to the Governments of Cape Colony and the Transvaal on civil reform 1904-6, secretary to the Finance Department of the Government of India, 1906-12, and vice-chairman of the Supervisory Commission of the League of Nations.

The Gold Standard.

" The Gold Standard " is the subject of Professor J. H. Jones' address to Section F (Economic Science and Statistics). He has been Professor of Economics and head of the Commerce Department in the University of Leeds since 1919, and was previously assistant lecturer in economics at Liverpool, and lecturer in social economics at Glasgow. During the war Professor Jones served in the War Trades Department and the Ministry of Munitions. He has written widely on the economics of war, the economics of private enterprise, and social economics generally, and was at one time editor of the *Economics Educator*.

Mr. R. W. Allen will address Section G (Engineering) on " Some Experiences in Mechanical Engineering," and the possibility and desirability of greatly increasing the production of gold is among the discussions in which this section will take part.

Belief in Fairies.

Section H (Anthropology) will be addressed on " What is Tradition ? " by Lord Raglan, who is best known for his writings on Oriental subjects, on which he is a leading authority. Among the varied subjects for discussion in this section are arts and crafts in East Africa, present tendencies in Colonial Governments, the distribution of the belief in fairies, the strengthening of superstitious beliefs among the tribes of the Gold Coast, and some aspects of kinship and the family in West Africa.

" The Activity of Nerve Cells " is the subject of Professor E. D. Adrian's address to Section I (Physiology). He is Foulerton Professor of the Royal Society and a member of the Medical Research Council and is well known as the author of several treatises on the physiology of the nervous system.

Section J (Psychology) will be addressed by Professor F. Aveling on " The Status of Psychology as an Empirical Science." He is Professor of Psychology in the University of London and is best known for his researches on the Higher Thought Processes which he commenced at the University of Louvain.

Section K (Botany) will be addressed by Professor F. E. Lloyd, who is Professor of Botany in McGill University, Montreal, and previously held the chair of botany at Columbia University. He has been engaged in many botanical expeditions.

" The Development of a National Educational System " is the subject of Mr. J. L. Holland's address to Section L (Educational Science). Some of the subjects for discussion are the education of the parent, the child in the changing home, and the predictive value of school examinations and psychological tests. Finally, Section M (Agriculture) will be addressed by Dr. A. Lauder on " Chemistry and Agriculture," and this section will also discuss the sociological aspects of agriculture, land drainage problems, grazing, and the handling and food value of milk.

A full report by our own correspondent of the outstanding papers read at the Meeting will be published in the October number.

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New Views of the Ancient World.

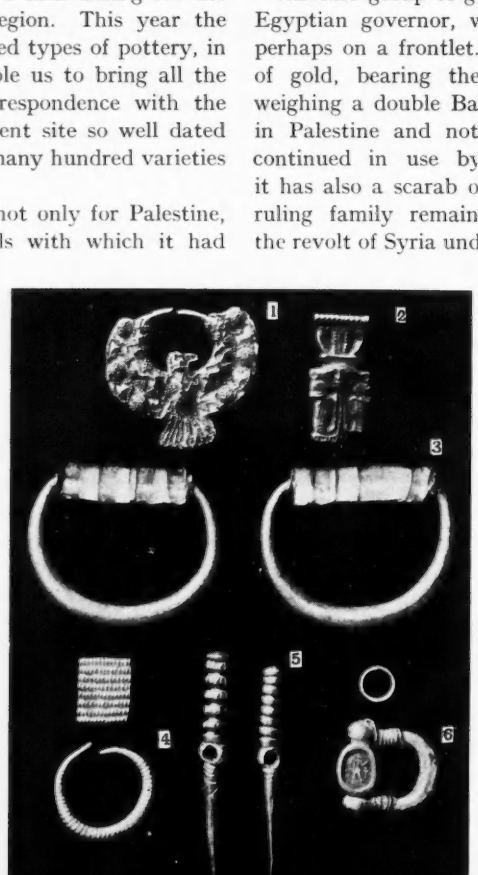
By Sir Flinders Petrie.

The latest discoveries at the city of ancient Gaza throw important new light on the history of early Palestine. A feature of the site is the abundance of imported jewellery, implements and pottery which tell us much about foreign connexions by trade and conquest. The last season's work is here reviewed by Sir Flinders Petrie.

THE recovery of the early history of Palestine and the connexion of it with the well-known history of Egypt, have been the aims of the British School of Egyptian Archaeology during the last seven years. Since I described some of the results in *Discovery* two years ago, there has been a large expansion of our view into the early ages. Last year we found at ancient Gaza five palaces, one over the other, dating from the VIIth to the XVIIIth Egyptian dynasty, or about 3100 to 1400 B.C. These give a firm dating for the levels of occupation in that region. This year the occurrence of a couple of hundred types of pottery, in different parts of the site, enable us to bring all the area of Tell el Ajjul into correspondence with the palace dates. There is no ancient site so well dated over a long period and with so many hundred varieties of pottery associated.

The value of such a scale is not only for Palestine, but also for neighbouring lands with which it had trade connexions. The abundance of finely painted pottery from the North, which is yet unplaced, is dating for us the civilizations which we have not yet tapped at the sources. One of the problems of ancient art is the origin of granular gold work. It was common in Etruria, and long before that it appears in Egypt on foreign work in the XIIth dynasty. Now two good pieces have been found of Hyksos time (3300-1600 B.C.) at Gaza, but we have not yet reached the Asiatic source of the art.

The embossing of sheet gold was an old method in Egypt, and is here seen on a head of Hat-hor (2) of about 1500 B.C. A strange group of Hyksos gold-work was found in a cenotaph built in the courtyard of the palace. Beside ten gold armlets there were two large ear-rings with a bar of lazuli to pass through the ear (3), ribbed ear-rings which are of the regular Syrian type (4), and two of the toggle pins (5) which especially are Hyksos—of these, more below. A thick gold ring (6) has a scarab imitating Egyptian style, but such a ring could only be worn on a slender little finger. The whole group is probably of about 2000 B.C., and draws on various sources which we cannot yet determine.



A group of Hyksos goldwork found in a cenotaph in the palace at Gaza.

Another group of gold work was in the tomb of an Egyptian governor, who had rosettes of gold, sewn perhaps on a frontlet. He wore a heavy official ring of gold, bearing the name of Tutankhamen, and weighing a double Babylonian shekel, therefore made in Palestine and not in Egypt. The same tomb continued in use by the family for fifty years, as it has also a scarab of Rameses II, showing that the ruling family remained in Palestine unaffected by the revolt of Syria under Akhenaten.

A wide view of the past is opened by the finding of a pair of torque ear-rings of gold of precisely the Irish fabric, dated about 1500 B.C. by the necklace with the gold pendants found with them. Another such ear-ring, rather smaller, was found in a room of about 2300 B.C. and with pottery which could not be later than 2000 B.C. These show the early date of the trade in Irish gold, taken to the farthest point of the Mediterranean, beyond the examples known from Troy and Cyprus. The process of making a strip of gold of cross end - section, and twisting it, is peculiar to Ireland. Another important foreign connexion is supplied by a large dagger with inlaid handle of the form belonging to Luristan in Western Persia, of about

2300 B.C. This method of inlaying handles with ivory, horn or wood seems to be Oriental, and is seen in the splendid bronze knife (7) which was in a grave of Hyksos date or earlier. The form was copied in the toy knife (8).

We have a foreign connexion of great historic value in the presence of bronze daggers with delicate raised veins on the surface (9), which was chased out between them. Three have now been found, all in tombs which are clearly before the XIIth dynasty, and the one figured here is probably of the VIIth or VIIIth dynasty. Such a pattern of dagger is unknown except in the Caucasus on the Caspian slope. Similarly the toggle pins are characteristic of the same region, both with ringed stem as illustrated and also with twisted stem as found at Gaza. These are invaluable way-marks indicating that invaders, both of the VIIth dynasty and of the Hyksos of the XVth dynasty, came down from the Caspian basin, a route of conquest which can be traced six times in history, the last being that of Salah-ed-din.

A group of knives and daggers which are evidence of widespread foreign connexions.

This flow of foreign connexions by trade or conquest reveals much for the history of the world, but much more comparative knowledge is needed before we can see the full value of it. Without comparisons such discoveries lie mute, like the find near Treves of a gold cup-lid covered with Persian designs, clearly foreign to Europe yet dated there to the very year of Xerxes, when he left such masses of treasure behind in his Greek war. The socketed knife (10) is a new type, found with a shouldered adze (11). The wheel (12) may have belonged to a model chariot, but a wheel disc is also used as a cheek-piece on a Caucasian horse-bit. The sunflower pin (13) is also Caucasian.

Anatolia and Cyprus were always largely in touch with Palestine, and pottery bowls from these countries are very common. Over three hundred pieces were levelled from the palace region, and it was found that the earliest were delicately painted; coarser painting comes in along with clumsy Cypriote imitations. The change is at the coming of the Hyksos. This serves as an accurate gauge, for the mixture is only found during about a century while the whole range of the bowls is eighteen centuries. As our knowledge of the ancient world grows, we shall be able more and more fully to understand all the linkage of history which we bring to light. An intrusion from the basaltic region of North Syria began in the Neolithic Age, and flowered in the Hyksos Age with fine bowls on tripod stands, sometimes with a central pillar and cross-bars. An example belonged to a man who was expurgated from the city with the destruction of all his property like Achan (Joshua, vii). This custom of ceremonial destruction is Canaanite, long before the Hebrew example.

Last year a pottery figure of unknown type was credited to the Hyksos; now another figure is found of the same people, with thick hair cropped short; it appears to represent a musician playing on a stringed instrument like a lute; this is probably about 1600 B.C. The trade weights, mostly of black haematite, are obtained every year, usually a hundred or more. They serve, by their standards of different countries, to prove the lines of commerce from various lands north and south. The old patterns of decoration lasted astonishingly in Palestine, so that it is often difficult to distinguish late work.

As to architecture, it is now seen that the invaders from the Caspian basin, at about 3200 B.C., built a much larger and more substantial palace than any later people; they were also in touch with other high civilizations in the grand age of 3000-2000 B.C., after which there seems to have been a general decadence in the East. The examples of widely gathered trade imports which are described above will show how we are gleaning a view of the constitution of civilization in ages which were supposed to be beyond recall. How much of this wide view of human history is to be recovered must entirely depend on whether the public will send donations for digging under the direction of the British School of Egyptian Archaeology. Unhappily no grants are to be had for such knowledge though this promising land lies waiting before us.

The Flight of the "Air Armada"

By J. L. Nayler.

Secretary of the Aeronautical Research Committee

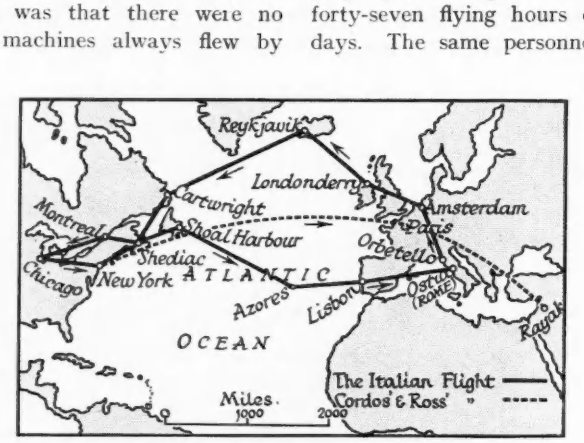
The flight of the Italian "Air Armada" is a remarkable new achievement for aviation. An expert here discusses its significance in helping to lay the foundations for a regular transatlantic route.

THE Atlantic has been crossed many times by air. The U.S. Navy in June 1919 sent three flying boats from Newfoundland via the Azores to Europe, making a series of flights with stoppages for refuelling and repairs, and led the way to the mass formation flying of the Italians which has recently captured the imagination of the world. In what lies the magic of Air-Marshal Balbo's accomplishment? Perhaps it is in the number of aircraft that participated simultaneously and in the objective—the World Exhibition at Chicago, which is expected to have such important results for trade.

The flight has been a striking demonstration of the efficiency of the Italian Royal Air Force, for no other nation could have put into the air twenty-five flying boats which could have covered such distances. In fact, there are only a very few other flying boats in the world which could have attempted the flight and certainly none could have flown 1,500 miles non-stop with full service load. Not many years ago a small formation of our "Southampton" flying boats made their way from Plymouth to Australia, all round that Continent and back to Singapore. The outstanding feature of that flight made by the British Royal Air Force was that there were no accidents and that the machines always flew by schedule and always arrived punctually to time. Their longest flights were less in distance and they could not have crossed the Atlantic. Now that feat has been far surpassed by a much larger formation flight, accomplishing a much harder self-set task.

Briefly, the Italians have accomplished successfully an aim which they put before themselves as a definite objective two years ago. A hundred officers and men were specially chosen and trained together to carry out a concerted plan, which included a flight across the ocean of the largest air fleet to leave its own home waters. Twenty-five seaplanes with crews of three or four persons set off on July 1st from Orbetello in Italy to fly to Chicago, and twenty-three returned to a triumphal reception at Rome on August 13th. It was a wonderful achievement.

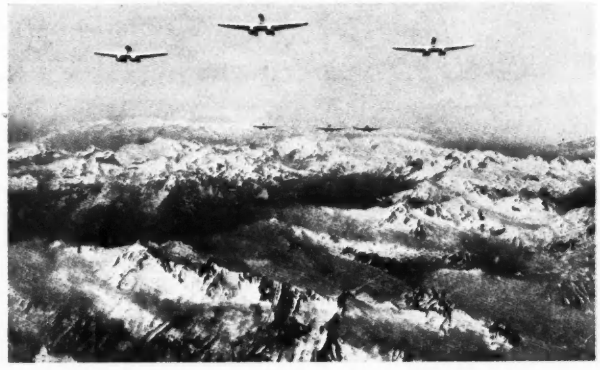
Their first flight was over the Apennines through the Giovi Pass at 10,000 feet and over the Alps through the Splugen Pass which lies at 13,000 feet above sea level; this was the first flight of its kind. After reaching Amsterdam on the first day they flew to Lough Foyle in Northern Ireland. From there to Rejkjavik in Iceland was a flight of 1,500 miles over the sea, part of which was through thick fog when each seaplane had to be flown by its instruments (to-day a fine art in the leading aerial navies of the world). From there to Cartwright in Labrador they passed uneventfully Cape Farewell in Greenland, one of the stormiest places in the world, but the Armada had below it a sea full of broken ice floes to within a few hundred feet of which they were at times forced down by fog and by fear of excessive cold. Ultimately twenty-four of the machines reached Chicago on July 15th, having flown a distance of 6,000 miles in forty-seven flying hours during a period of fifteen days. The same personnel could have reached the same objective in less time by train and liner, but we must remember that such a journey as they made was essentially of a pioneer nature. Moreover, their speed when in the air averaged 128 miles an hour, compared with the (say) twenty-eight miles per hour of the ocean liner.



The route of the "Air Armada" compared with that taken by Cordos and Ross.

After a short rest the return journey via New York, Newfoundland and the Azores was accomplished at a higher speed as the prevalent winds over the Atlantic are from west to east. Again there was much blind flying, especially in the first six hours after leaving Newfoundland.

Two fatal accidents, one on landing at Amsterdam and the other while taking off at the Azores, were probably such as would not be likely to occur on an organized air-route and must not therefore be allowed to detract from the fine performance. Nor also should much attention be paid to three or four engine failures that delayed no seaplane from joining its fellows by more than a day. Instead, we might well lay great stress on the skill which avoided the no slight danger of collision, especially when flying in fog and low cloud, even though each seaplane was in constant communication by wireless with the rest of the squadron. Air-Marshal Balbo in his first report to Signor Mussolini laid emphasis on the valuable assistance that wireless had given.



A squadron of the Italian seaplanes over the Alps.

The reader will now be asking whether there was anything remarkable in the seaplanes flown, but this was not the case. Considerable experience has been obtained with the Savoia-Marchetti twin-hull tandem-engined type seaplane. In 1930 General Balbo, as he then was, led twelve of them from Rome to Rio de Janeiro and the same type was used by Col. the Marchese de Pinedo in his famous flight round the Atlantic. The 1933 S.55X type has more powerful engines of 885 horse-power, being the Isotta Fraschina eighteen cylinder water-cooled type. The engines are mounted fore and aft above the monoplane wing, which is supported on two hulls and has a triple tail separately supported behind by outriggers. The pilots' cockpit is in the centre of the leading edge of the wing between the two hulls, the two pilots sitting side by side and having dual controls.

The normal Savoia S.55 is used for military purposes and carries gunners both in the nose and stern of each of the hulls, and may have either bombs or a torpedo slung under the centre section of the wing. There is also a civil type with accommodation in each of the two hulls for four or five passengers. As flown on the present flight, there were arrangements for carrying an additional petrol supply to give a range of flight of over 2,000 miles without head wind, whereas the normal range is only of the order of 1,200—1,500 miles. The consumption of petrol must have been about 1,000 lbs. weight per hour for the two 900 horse-power engines. It is not surprising to learn, therefore, that the total weight of each seaplane when fully loaded was eleven tons.

We must regard the seaplanes used as normal in type and the flights as also normal, given reasonably good weather. The Italians went to the U.S.A. by the northern route via Iceland, a route that has been much studied during the past few years by this country and is now under the keen eyes of Colonel Lindbergh and his wife acting on behalf of American interests. It is possible to follow this route and not have a sea journey greater than 300 miles but the conditions of weather and of ice and cold have so far presented a stumbling block to the enterprise of commercial aviation. The Southern route via the Azores by which the Italians returned has much longer sea distances, including the 1,200 miles from Shoal Harbour, Newfoundland, to the Azores, and another 800 miles on to Lisbon. It has the advantage of a prevalent following wind from west to east and the corresponding disadvantage of a head wind in the reverse direction. In the case of a forced descent the Savoia seaplanes would not have been robust enough to withstand the average Atlantic roller for more than a short time.

We must also not think that the Italian flight is the best than can be done at the present moment. This year has seen Cordos and Ross fly non-stop from New York to Svria, a distance of 5,600 miles at an average speed of 102 miles per hour in a time of fifty-five hours, that is just over two days to cover a distance greater than the direct route from Chicago to Rome; we have also admired Mr. Wiley Post who has circumnavigated the Northern Hemisphere in less than eight days. Thus, while acknowledging the wonderful accomplishment of the Italian Armada, we must look forward with Sir George Cayley to a more general realization for all of us of the advantages that civilization may expect from the use of that "uninterrupted navigable ocean that comes to the threshold of everyman's door."

Colour in Animals: A New Theory.

By Malcolm Burr.

In a new book, Major R. W. G. Hingston proposes an ingenious theory to account for the colours, adornments and weapons of animals, as well as many other problems in biology. Dr. Burr discusses some of the points involved.

THE work of a naturalist of so wide and varied an experience in the field as Major Hingston is bound to command respect. In his latest book* he elaborates a new and original theory, his golden key to all the riddles of biology.

Fear and Hostility.

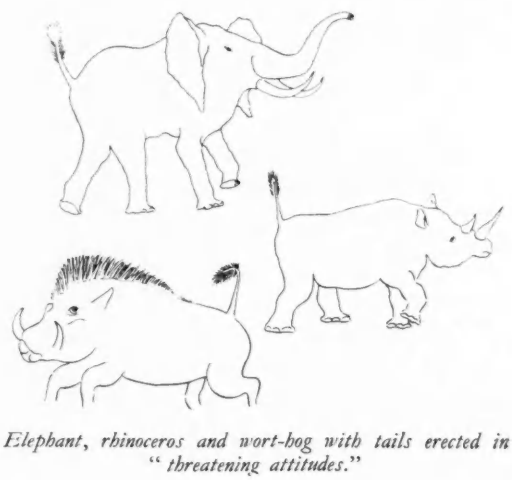
The author would explain the pattern, colour, ornamentation and armature of all animals, at least from insects to mammals including man, as the resultant of two conflicting "forces" or tendencies, concealment and self-assertion. There is a growth-force in the individual, he maintains, the only *internal* force, which produces this conflict. The action of natural selection is only to retard or advance its action, for he rejects it as the cause of the formation of species on the grounds that it is an *external* force and merely selective. For Major Hingston is a vitalist: "I hold the cause of evolution to be the conflict that exists in the vital forces inherent in life itself." (p. 395). The key to his philosophy he gives us briefly; it is "the urge inherent within life itself to express that force which, for want of a better term, we must call its emotional content." In his eyes the driving force of evolution is the striving of every species to increase its "hostile side," which is held in check only by the necessity for concealment, the "fear side." He claims that evolution is *always* in the direction of greater hostility, never of greater protection. He sees in his theory the answer, not only to all problems of coloration and armament, but even of the formation of geographical races and the very extinction of species.

The author claims that a species can die, just as an individual. Thus he accounts for the disappearance of the great mammals of the Miocene. Presumably he would not admit, even as collateral causes, change of environment, over-specialization, which may exterminate a species as much as an individual or a craft, and even modification by descent, which will make a specific, and then a generic difference between scion and stock. For him extinction is but the natural termination of the vital process inherent in the species. But the book is so crammed with interesting observations and ingenious theory that it is stimulating to read. The illustrations are characteristic of Major Hingston's art and very explicative. On the whole they are good, though the roan on page 55 is barely recognizable. At the same time there are certain general faults which call for comment before detail can be approached and controversy opened. Major Hingston offers no theory to account for the method of operation, by what mechanism a phasmid comes to resemble a leaf or a lion to grow a mane. The words mutant, gene and chromosome do not occur in the book.

A mass of observations are quoted without the support of authority, though in some instances the author gives the name of the observer. There is no bibliography. Major Hingston does not make clear until page 190 the essential difference between rivalry of males within the sex on one hand, and defence against a common enemy on the other. Another minor defect is the constant personification of nature. "Nature does nothing without reason" (p. 53); and in another passage it is claimed that Nature is always economical, an assertion which few will be willing to accept.

Bright Colours.

The author claims categorically that bright animal colour everywhere means threat. This we cannot accept, for it is frequently cryptic. The gorgeous plumage of the bee-eater, which appears dull by transmitted light, flashes and almost disappears in the reflected light of brilliant sunshine. The black and



Elephant, rhinoceros and wort-hog with tails erected in "threatening attitudes."

**The Meaning of Animal Colour and Adornment.* (Arnold, 18s.)

yellow of the golden oriole conceals the cock bird in the broken sunshine and shadow of the thick foliage he loves as much as the dull green conceals the hen. The vivid coloration of tropical fishes is probably always concealing, just as the pattern of tigers, in fact of all cats, and also of zebras, is really cryptic.

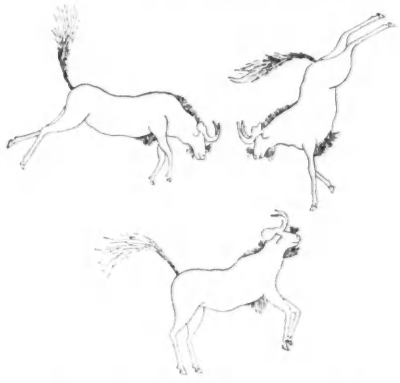
"Bluff" in Birds.

Major Hingston's objection to sexual selection is the apparent indifference of the females to the splendour of the males, and that all secondary sexual characters are part of the rivalry complex of the owner, the self-assertiveness of the males directed, not to charm the female, but to outdo other males, either in single combat, as with the deer, or by sheer brilliance of song or plumage as in most birds and butterflies. In this connexion the author makes a good point, that in birds and butterflies we see psychological fighting. He means that even when the creatures are too feebly armed to inflict bodily damage upon each other, they may buffet each other perhaps, but the essence of the fighting is bluff, the outdoing of the other by deliberate exhibition of brilliant coloration. He does not admit the possibility of bright colour and elaborate ornamentation being the manifestation of sheer exuberance of vitality. Warning colours he rejects on the grounds that an explanation is not good unless it covers *all* phenomena, although his own argument is hardly more than the same thing in different words. He merely insists that it is more than advertisement; it is a threat.

Some of Major Hingston's generalizations are interesting, but not all are acceptable. He points out that marked differentiation between the sexes is an invariable sign of polygamy, and that a few remarkable instances of sex reversion in birds, which he quotes, are accompanied by polyandry. He points out in this connexion that not only is the lion the only cat in which there is a marked difference between the sexes, but that it is the only cat which is polygamous. He states that concealingly-coloured insects of all kinds are, in his experience, far rarer than the brightly coloured conspicuous forms. This may be true of the Rhopalocera, but is not of the Heterocera, while in the Orthoptera the proportion of cryptically coloured forms is overwhelming.

The author makes a good point that young animals need concealing colours more than threatening, as they cannot fight until adult, when the threatening colours first appear. It is an interesting suggestion, too, that the brilliant coloration of the mouth and throats of nestling birds is to intimidate small enemies, and in the same way he interprets the red crests of woodpeckers, though they might equally be signals to the parents.

He reminds us that in butterflies, which, he explains, are addicted to psychological fighting, the brilliant



Some threatening attitudes of the gnu, displaying the crest, the breast tuft and the beard.

pattern of the aposematic species is identical on under and upper side; that is, that the concealing pattern has been overcome by the aggressive; but in the great majority of cases, the under side is cryptic, or as he calls it, concealingly-coloured, while the upper is brilliant because in butterflies colour is a weapon and the brightest specimens are supreme. In larvae, of course, the sexual element does not arise, so all weapons are purely defensive against the common enemy.

Major Hingston makes a highly ingenious comparison between the brilliancy of butterflies and the luminosity of fireflies. When luminosity exists through all the stages it is clearly distinct from sex, but if it is a warning colour, a threat, why is the male of the common glow-worm deprived of this advantage? Are his organs of flight adequate compensation?

The author makes several novel points. For instance, he claims that the erectile, bristly portion of a mammal's coat has no connexion with warmth, but is part of the threatening apparatus, well seen in the hackles of a dog. In support, he states that profuse hair erection accompanies ferocity, quoting dogs, cats, civets and mongoose, in fact, all Carnivora. Here he overlooks the *defensive* value of such hairs, as armour against fang and claw. The mongoose appears to be double its natural size when it bristles up, and so deceives the snake which spends its strokes upon the empty hairs. In this case at least the hair is not directed against other males.

An attractive explanation is offered for the ringed pattern of tails in many mammals, which, the author claims, serves to make them conspicuous, and so

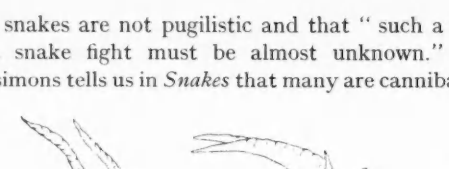
aggressive, in the dusk. The same principle of aggressiveness accounts for the ringed pattern of spines in hedgehogs and porcupines. He accounts in the same way for the black and white pattern of the badger's head, and here he offers a remarkable explanation. He writes that a badger does not threaten in the ordinary attitude of a dog, but "when in difficulties, it backs into a corner, drops its nose between its paws and directs the back of the head to the enemy."

The Badger's Defence.

This peculiar attitude of the badger in difficulties is confirmed by other observers, but few will agree with the author's interpretation. He suggests that it is an attitude of threat, exhibiting the bold black and white pattern of the back of the head. Such an explanation seems unnecessarily obtruse since the author's own theory offers a more feasible solution, for the bold pattern is most marked along the formidable jaws. As a matter of fact the snout, as in dogs, is a very vulnerable point, which the creature endeavours to protect. A writer in *The Shooting Times* for July 20th, 1933, not only makes this suggestion, which seems to be the reasonable one, but calls attention to a hard ridge of bone which runs along the top of the badger's skull; this makes it very strong and resistant to a hard blow, so it may well be exposed to the attack. It is, in fact, not an *aposeme* to frighten an enemy away, as Major Hingston suggests, but as *episeme*, to distract attack from a vulnerable to a fortified or non-vital region.

The author states emphatically that bears which have no white marks on their chest attack only on all fours; he omits *Ursus arctos*, the best known and widest spread species of all. The habits of this species vary considerably with the district, but all experienced sportsmen describe how it raises itself upon its hind legs to attack with its tremendous fore paws.

It is difficult to believe that the erection of the tail in an angry elephant has any significance of threat. A charging elephant is in any case a terrible apparition, but with the great ears extended and the trunk raised, the diminutive tail is unlikely to be visible from the front by anything shorter than a giraffe. The author maintains that the "menacing and monstrous-looking eye-spots of the cobra accentuate the snake's undoubted threat." But as the victim is presumably in front of the snake and the eye-spots are at the back of his neck, the accentuation can be of little value. As a matter of fact, there is actual utility in the threatening behaviour of cobras and other snakes, for it enables them to economize in venom. The author claims that snakes are not pugilistic and that "such a thing as a snake fight must be almost unknown." But Fitzsimons tells us in *Snakes* that many are cannibalistic



Eye and mouth marks in the blackbut and the roan. Are they "threatening devices"?

and that they are so quarrelsome that it is difficult to keep them in confinement. Black may well be a threatening colour, but it is hard to believe that elephants, rhinos, hippos, and whales and porpoises are black because they are so powerful that they have no enemies to fear, so that the anger-side has it all its own way, without interference from the fear-side. Why, then, are not some of them bright red?

Major Hingston quotes Mr. Pocock's observations on a mynah, which first pecked out the eye-spots from the wings of a peacock butterfly before eating it. He claims that the bird recognized these as fearful and disarmed its prey before consuming it. To many this interpretation will not be acceptable. When a crow or a magpie pecks out the eye of a dead or dying rabbit, or a gull that of a wounded sheep, is it in order to disarm it? Is it not that the bird regards it as a delicacy? Is not the function of these eye-spots more likely to divert the enemy's attention away from a vital spot to a corner of the wings, with may be sacrificed without serious loss, just as a lizard discards its wriggling tail and then escapes unobserved? To use Professor Poulton's terminology again, the author has taken *episemes* for *aposemes*.

Although Major Hingston makes a distinction between domestication and confinement, he contradicts himself in discussing the effect of these factors upon colouration. Red is the chief threatening colour in birds, but in captivity it is frequently replaced by yellow, which is less aggressive. The author adduces these undoubted facts to support his theory, maintaining that confinement leads to *loss* of hostility, both towards man and each other. But is not loss of vitality enough? He argues that in captivity, the "fear impulse is released," so there is no more need for concealment, and consequently the hostile impulse has free play. That is, the force that makes new

domestic breeds is the hostile impulse in the creature itself (p. 366). He therefore marshals the hostile impulse itself and at the same time its loss to account for changes under domestication. Further, as in captivity the hostile impulse dies down, animals decline to breed under these conditions. On p. 367 Major Hingston writes : " There can be little doubt that what is true of domesticated breeds must hold good for animals in a state of nature." Thus he contradicts his own statement that the fear impulse is released and only the hostile impulse develops.

A Problem for Naturalists.

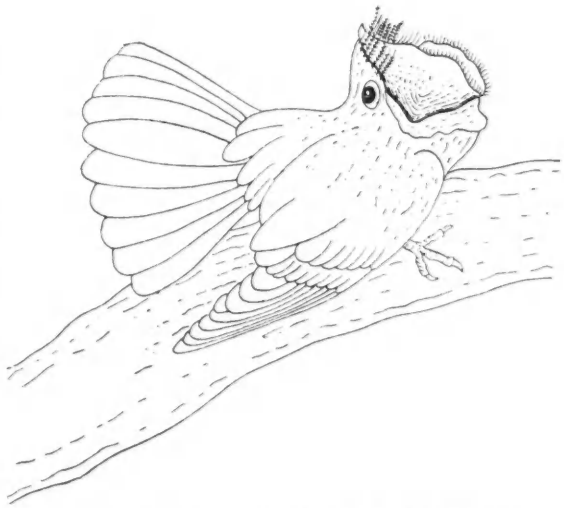
The author maintains that coitus has not been properly understood by naturalists, that, as well as the act of reproduction, it is also a paean of triumph, of victory by the male over its rivals. As the hostile impulse dies down in captivity (though, it must be remembered, in domesticity it is the reverse, and we get extravagant prolificness and development of new races), coitus loses half its significance and consequently fertility. On p. 392 he states that under domestication the fear side is eliminated and the anger content fully expressed, therefore it follows that domestication increases fertility, which is a manifestation of anger, while mere confinement decreases it, apparently eliminating the anger content. In fact, the whole of this part of the book, with its complicated argument, is weakened by confused expression and lack of clear thinking.

Major Hingston rightly states that the elephant is so powerful that it has only one enemy, man. The fear-impulse, therefore, had died away, and the anger-impulse had free play. That accounts for its black colour, and for the tusks. He argues that, as these impulses have a limited force and tend to die down, the elephant is approaching extinction, just as the other great tusked mammals have disappeared. Thus it has become a violent and irritable animal. It is much to be doubted whether experienced elephant-hunters would confirm either conclusion. Indeed, the author himself quotes Sir J. Tennant as stating that the Ceylon elephant " lives on terms of amity with every quadruped in the forest." In discussing the use of tusks for defence the reference to the Ceylon elephants is unfortunate ; it is quite true that this race cannot use its tusks for defence, for it is tuskless.

No reference is made to the fact that all bodies must possess colour and form and that it is not necessary to seek a teleological reason in every case. Blood is not red for the sake of aggressiveness, but red is the chief aggressive colour owing to the chemical composition of blood in the higher animals. In the Phasgonurid Orthoptera it is yellow. Since the redness of blood is due to its chemical composition, the internal organs of animals are brilliantly coloured. Is this aggressiveness? In some mantids they are of a bright turquoise blue. If that is to threaten a bird which contemplates eating it, surely its action would be a little late ?

Major Hingston discusses in detail the male ornaments of primitive man. He sees in the axillary and pubic tufts survivals of the day when pre-human man fought with nature's weapons only and inspired fear in attack by assertion of virility, by exhibiting these tufts, as a dog his hackles or a lion his mane. This must have been at that period in his history when he had already lost his general hairiness, or the tufts would hardly have been noticeable, and therefore taken to wearing clothes, presumably skins, which implies the use of weapons. This would reduce the value of the bluff. The author is also assuming that primitive man squared his elbows in battle, that this is an instinctive pose in all races, a point that perhaps the anthropologists will confirm for us. The physiologists will probably tell us that the growth of these tufts is encouraged by warmth and moisture due to their situation, and that they actually serve to reduce friction of the skin. Besides, in a negro the close curly, black hair patches are scarcely visible even at a close distance, so that theory can hold good only for the northern races.

Major Hingston has given us a remarkable book. Whether accepted or rejected, in whole or part, his theory must stimulate thought and discussion.



A bird in an attitude which Major Hingston holds to be one of threat.

Basic English: An International Language.

By C. K. Ogden.

Director of the Orthological Institute, Cambridge.

" The citizen of to-day is the victim of new forms of Word Magic so universal and so subtle that he is unable ever to escape their influence." Basic English represents a selection of 850 words which claim to cover the every-day needs of more than 500,000,000 people. The author analyses the advantages of the system in the field of science.

ONCE upon a time there was a Queen of the Sciences whose name was Grammar . . . It certainly seems like a fairy tale of long ago; but in 1433 the scientist and the layman had a common international language which served as a becoming throne for the queen; by 1533, Word Magic was extending its sphere through the printed word; by 1633, the Authorized Version was helping to divert the interests of the logolatrous from priestly doctrine to verbal formulae; by 1833, the dogmas of correct usage had established themselves in the pedagogical and literary world; and 1933 finds verbalism everywhere rampant.

A Thousand Languages.

The citizen of to-day is the victim of new forms of Word Magic so universal and so subtle that he is unable ever to escape their influence. The Babel of a thousand languages will soon assail him on the ether, and could he distinguish a dozen of them he would be a scholar of repute; the Law under which he lives is a hocus-pocus of well-considered jargon, a maze of potential logomachy which baffles even its most sinister adepts; the hypnotic iterations of the Press direct and control his social emotions; Science with its untranslatable symbols is a mystery book, closed to all but its own high priests—if not to them also. Is it not time for grammar, the normative analysis of symbol systems, to be cultivated once again?

It was Jeremy Bentham who first endeavoured to loosen the noose of words which is choking us all to-day, whether we are conscious of it or not. Though his chief interest was the clarification of legal jargon, he was led from the theory of definition, through logic, grammar, and psychology, to the problems of symbolic simplification and to a discussion of the future of English as the structural basis for an international auxiliary language. In an historical sense, Basis English is the outcome of his labours; a scientific selection of 850 words which cover all the needs of every-day life, without appreciable deviation from the language, natural or governmental, of more than 500,000,000 persons.

In the past three hundred years, artificial or synthetic languages have been produced, on the average, at least one per annum. None of these has seemed or seems likely to secure more than a handful of supporters. Esperanto, one of the few survivors, is an interesting psychological experiment, and has still some thousands of enthusiastic adherents, chiefly in western Europe. Being based entirely on European roots and inflections, its alleged neutrality for the East, for India, or for Africa, is an illusion. English, on the other hand, is already the second language of the East, and only requires simplification to render it an ideal international medium.

The general principles on which such simplification can be achieved were set forth in " The Meaning of Meaning " (1923). By a development of the theory of multiple definition there described, and an analysis of the Indo-European verb-system in terms of its operational and directional constituents, the 20,000 words of normal discourse were gradually reduced, over a period of ten years, to the 850 units which will cover the field for the purposes of international communication.

Basic (British - American - Scientific - International-Commercial) English, as its title indicates, has a five-fold function. It provides a fundamental approach to the English language; it exploits the analytic tendency of modern American speech; it constitutes a medium of scientific communication; it solves the problem of an international auxiliary language; it will promote and be promoted by the progress of international trade and commerce.

Basic in Science.

Science, which concerns us here, is in a central position both in the acrostic and in the Basic programme. Science is the greatest internationalizing force in the modern world. Through science the rapid diffusion of Basic—by radio, talkie, and telephone—has become possible; and science itself, now reaching less than ten per cent. of its potential international public, might go forward with greatly increased efficiency if the language barrier were removed by the adoption of Basic for Abstracts and Congresses.

One of the first essentials is a re-classification of the sciences in order to determine their linguistic affiliations. In " Basic English Applied: Science," the main principles on which the work would proceed

have been outlined. For science in general there are 100 words with which the layman has no concern at present; and for any branch of science which is sufficiently important or isolated there are 50 special words with which the other branches have little or no concern. Above this level inter-nationally accepted or standardized terminologies are, or could quickly be made, available.

In the exact sciences with their more rigid definitions, their relatively modern nomenclatures, and their accepted formulae, the higher levels of the vocabulary present little difficulty. Chemistry, physics, and even biology can be covered on the lines already indicated with comparative ease—at any rate for all who are seriously concerned with scientific communication in these fields.

At the other end of the scale, too, the problem presented by those branches of knowledge which are still able to rub along with the language of every-day life requires only thought and patience for its solution. Psychology, for example, is quite as tractable as economics, while sociology and the historical approaches are chiefly in need of the committee-work appropriate to titles and descriptions such as those by which the radio announcer is already faced.

The First Need.

The difficulty is rather with technology (as represented by the specialized vocabularies of different trades), engineering, and medicine. As in those groups of sciences which are still largely undifferentiated from a linguistic standpoint (oceanography, for example), the first need is for a new classification of the subject-matter in relation to vocabulary overlaps. When it has been determined *which* branches of a given discipline are united by a common vocabulary, the task of selecting the 50 words necessary to supplement the Basic 850, for a particular purpose or interest, can be undertaken by the specialists directly concerned.

Much solid work is being done in England by various bodies in a quiet way; but most of it is unco-ordinated and it fails to attract the attention either of scientists or the public. If an interest were aroused either by endowment, or by the new possibilities which Basic has opened up, English scientists could doubtless give a good account of themselves. Meanwhile, it would seem that America is making the pace, through such bodies as the American Bureau of Standards, the American Institute of Electrical Engineers, and the New York Academy of Medicine.

The annual reports of the first named organization show that its sphere of activity is rapidly expanding, though relatively little attention has so far been devoted to language. In conjunction with the electrical engineers, however, an admirable report on "Standard American Definitions of Electrical Terms" has been prepared (1932); it covers approximately one-fifth of the engineering field, and might well form a basis for international development on the same lines. An analytic background would thus be provided for the carefully planned series of technological language guides now being issued for students of English by the "Verein Deutscher Ingenieure."

Nomenclature of Disease.

Equally capable of generalization for international purposes is the report on "Nomenclature of Disease" prepared by Dr. H. B. Logie, with the assistance of the Commonwealth Fund and in conjunction with the New York Academy of Medicine and other bodies. The American Medical Association itself would be in an ideal position for sponsoring simplified abstracts, as soon as an experimental international vocabulary has been decided on.

For the scientist who desires to familiarize himself with the system in so far as it may apply to his own work, the publications most likely to be of assistance are four in number. "Basic English" itself is a general introduction, summarizing the principles and the technique in an historical setting. "The Basic Words" covers the senses and uses of the 850, and is designed to be used in conjunction with the "ABC of Basic English" (in Basic, dealing also with metaphor and idiom) by all who desire to acquire proficiency in writing. Experience shows that after about a week's practice anyone with a knowledge of normal English will not only begin to use the new medium fluently, but will discover in it a stylistic and even a mental discipline of unsuspected power. When at a loss for Basic equivalents, however, it is often convenient in the early stages to consult "The Basic Dictionary," where hints are given for dispensing with some 7,000 of the commonest words and locutions. This dictionary of equivalents will, of course, be greatly expanded in the near future, but even in pocket form it has proved of great assistance as a time-saver.

In the field of science, in addition to the volume mentioned, which covers mathematics, physics, chemistry, and biochemistry, a number of specialized studies are in preparation. The first of these, "Basic for Economics" has just appeared; and with no more than 50 technical terms below the international level, it tackles typical extracts from Marshall, Stamp, Lavington, Sargant Florence, Malthus, and others. These departmental studies are to be further supplemented at an early date by a variety of

translations and adaptions with a more popular appeal. To give the reader an idea of the scope of the vocabulary, and the way in which it is manipulated, let us take a few sentences from Faraday's "Chemical History of a Candle," and put them into Basic :

"I have here a heating apparatus with a pipe going through it like a hollow part of a gun ; the pipe is full of small bright cuttings of iron, and I have put it across the fire to get it to a great heat. We may send air through the pipe so that it is all round the iron, or we may send steam from this small boiler at the end of the pipe. Here is a control for shutting off the steam till we have need for it. There is some water in these glass vessels, coloured blue, so that you may see what is going on. Now, it is common knowledge that any steam I might send through that pipe, if it went through the water, would become liquid. You have seen that steam, when made cold, does not keep its vapour form : if I sent steam through that pipe, it would become liquid—if the pipe was cold ; so for the operation I am now going to do, it is heated. I am going to send small amounts of steam through the pipe ; and you will see for yourselves, when it comes out at the other end, if it is still steam. Take a look at what is going on in the glass vessel. Bubbles of gas are going in, and the water in the vessel is being pushed out. What is this gas ? Is it steam ? Steam will become liquid water, but the gas which I have got in this vessel has been made cold by putting it through water after it has gone through the iron pipe, and still it is not changed back into water.

"I will do another test with this gas. (I keep my vessel upside down, or my substance would get out.) If I now put a light to the mouth of the vessel, there is a small noise and the gas goes on burning. Steam puts out a fire—it is not possible for it to be burned ; but you saw that what I had in that vessel went on burning. It is hydrogen (H). We may get this substance from water produced by a candle flame, or, equally, from any other material. When it is got from the reaction between iron and steam, the iron in the pipe is in a condition very like that of the bits of iron after they have been burned. The iron has a greater weight than it had before. While the iron is heated in the pipe and is made cold again without air or water getting to it, its weight is not changed ; but after having had this current of steam going over it, its weight is greater than before, because it has taken something from the steam and let the hydrogen go off."

Model Translations.

A variety of model translations have been published —from a literary *tour de force* such as Leonhard Frank's "Carl and Anna," Tumura's "That Night," Lafcadio Hearn's "Japanese Stories," to "Robinson Crusoe," "Black Beauty," Poe's "Gold Insect," Lamb's "Stories from Shakespeare," and "Stories from the Bible." The general argument for Basic is developed at length in a volume entitled "Debabelization." A set of gramophone records, four in number, covering the 850 words and the difficulties of pronunciation, has been made by Professor Lloyd James ; while other aids, by which the foreign learner is enabled to get control of the system in less than sixty hours, are referred to in the "ABC." All these may be obtained from the Orthological Institute, 10, King's Parade, Cambridge.

Now that the system is available in its complete form, the next step is to secure endowment and support for the necessary scientific standardization, and for the translation and adaptation of the essentials in as many languages as possible. Representatives have been selected in more than twenty countries, and through their efforts diffusion will be greatly accelerated. Within a few months, translations will be available in Chinese, Japanese, Burmese, Polish, Swedish, Danish, Czech, Spanish, Italian, and German.

In the Far East.

With the aid of the Rockefeller Foundation a special study of the linguistic problem in the Far East has been initiated, and during the last fortnight in July a Basic Conference with the Institute of Pacific Relations was held in New York. As a result of these and similar discussions, the preparation of dictionary material on new lines has been undertaken by a number of research workers under the direction of Professor Okakura in Tokyo and Mr. F. J. Daniels in Otaru ; and it is hoped that the programme of lexicographical simplification may be extended to China in the near future.

From a scientific standpoint, then, the advantages of Basic are obvious. As Sir John Russell recently emphasized, a knowledge of more than twenty languages is now necessary to keep abreast of any developing science. A reduction in the purely linguistic labour of conducting research would surely divert much misspent energy into more profitable channels. Moreover, we are forced by Basic not only to express ourselves clearly, but to think clearly.

Most of us are able to use a number of glib scientific phrases so long as we do not stray outside the verbal context with which we happen to be familiar ; much as foreigners will master impressive phrases, while quite incapable of operating their component parts. It is easy enough to talk about eclipses though ignorant of how they are caused, or to refer to Mercator's Projection without having any idea of the principle on which it is constructed. Up to a point, it might even be possible to satisfy an expert. But, as any parent will agree, the childish questioner will very quickly call our bluff. The fact that Basic necessitates lucidity of a degree which would enlighten such a questioner will undoubtedly prove embarrassing to individuals ; but there can be no question that the world as a whole will gain much by the discountenancing of jargon.

Prize-winning Travel Essay.

Plant Hunting in Persia.

By P. L. Giuseppi.

As announced on page 266, Dr. Giuseppi has been awarded the first prize for the best account of a journey in England or abroad undertaken by a reader of DISCOVERY. *The author describes his search in the mountains of Persia for a race of beautiful plants, the Dionysias, which are to be found only in that country.*

WHEN I first mentioned to various friends my wish to hunt for plants in Persia, I was told that I should be captured by brigands, that the roads were impassable for cars, and finally, I suppose as best of deterrents, that the Persians would never let an English car into their country. However, I persisted in my idea, principally because on the high mountains of Persia and only there was to be found a wonderful race of plants, the dionysias.

Thanks to the good offices of Sir John Simon, I found that I was received at the frontier east of Baghdad with great friendliness, and in less than half an hour I was through the customs and other formalities and was driving in Persia. My first impression of the country was its aridity, and that impression remained with me throughout my stay.

Persia consists of a high plateau at the level of 5,000 to 6,000 feet, composed mostly of brown earth and very largely of desert or semi-desert. Surrounding this plateau are chains of high mountains, the Elburz in the North with Demavend 16,000 feet in height, the Zagros range on the West, the mountains round Kerman, Kuh-i-Taftan the great volcano of 13,500 feet and other mountains in the South, and a few lower chains along the Afghan and Beluchistan borders. In addition to these mountains there are high chains running across the plateau, such as Schir Kuh at nearly 11,000 feet, and Kohrud. All these mountains are composed of bare water-worn roacks, are very steep, and have little vegetation and few trees. They rise directly from the plateau with few, if any, foot-hills and are all the more impressive for that reason. It was, to use Farrer's expression, to hunt for "the little people of the hills" that I went so far afield.

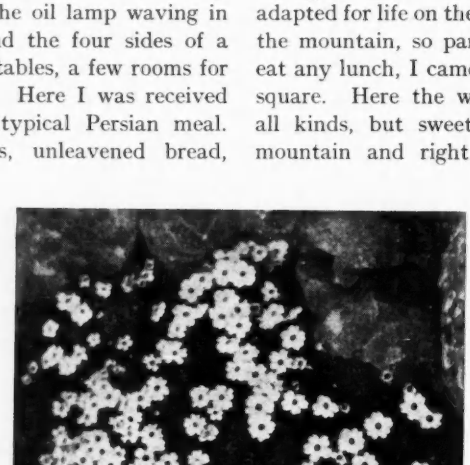
Sketch map of the author's route.

From the frontier to Hamadan the road rises until on the summit of the Asadibad pass it reaches 7,800 feet in height amidst stern and forbidding surroundings. The first trouble we met was the police—and this trouble stayed with us throughout the trip. At the entrances and exits of all the towns the police stopped the car and a perfect inquisition started on one's age, names, those of all one's parents and grand-parents, and minute details of the car. All this was laboriously entered on dirty pieces of paper, which were then hidden in pockets, boxes, anywhere and everywhere. Smiles sometimes worked wonders, at other times a show of temper had a similar effect, but the only invariable cure was to arrive after the police had gone to bed, and to leave before they were awake!

My second hotel was the best in Persia, the Hotel de Paris in Hamadan, which is magnificently situated on the slopes of Alvend. The plains round Hamadan were golden with the flowers of the Persian rose, *Rosa Berberidifolia*. This plant with its wiry and thorny stems is the commonest brushwood of Persia. It is scrubbed out and sent on donkeys to the towns and villages to be used as firewood. The flowers are sweet-smelling, single and golden with a red heart.

My first true Persian *caravanserai* might have walked out of the pages of " Ali Baba." I came to it late at night at Adadeh as I drove south to Shiraz. My attention was drawn to it by the oil lamp waving in the air. I found it built round the four sides of a large square and consisting of stables, a few rooms for travellers and a small kitchen. Here I was received with courtesy and enjoyed a typical Persian meal. I was given hard-boiled eggs, unleavened bread, *mast* or sour milk, and an unlimited number of glasses of hot tea. Tea is the one extravagance of the Persian and is drunk from small glasses with two lumps of sugar, one of which is placed on the tongue before drinking the tea, and the other afterwards eaten.

The inn-keeper and his friends were delighted to see us and were quite disappointed when we retired to sleep in our sleeping-bags in the tiny room allotted us. The only furniture was an oil lamp, but fortunately there were no insects and we slept well. The view of Shiraz from the pass of " God is Most Good " is famous as one of the greatest beauty and here I was rewarded with a view of my promised land, the first mountain I intended to climb, Sabst-i-Puschom, a long chain to the South of Shiraz. Thither I hurried on foot across a flat plain in great heat, and finally having waded through a foul smelling bog, I reached the foot of the chain and made my way up the arid slopes, parched with thirst. The main town was composed of water-worn rocks, bare of vegetation, but the little there was interested me intensely.



Dionysia ianthina, one of the race which is to be found only in Persia and Afghanistan.

Here I first saw *Gentian Olivieri*, a little beauty of blue ; here too grew the tiny flowered *Campanula incanescens* with woolly leaves and tiny purplish flowers which though small were very decorative in their numbers ; and here I found my first dionysia, a shrub with woody stem, called *revoluta*. There were only five plants on the cliff and no others did I see on the mountain. The plant only grows on this mountain and is certainly dying out. The flowers are golden in colour and have a long flower-tube. Dionysias, with the exception of one which grows also in Afghanistan, are only found in Persia and are highly adapted for life on the arid mountains. As I descended the mountain, so parched that I had been unable to eat any lunch, I came to a tiny rock pool about a foot square. Here the water was people with insects of all kinds, but sweeter water never existed on any mountain and right well did I enjoy it. On my return across the plain I stopped at the black canvas tents of the Bakhtiari tribesmen and was given an enormous bowl of sour milk. This is one of the best foods or drinks I have ever enjoyed, cool, refreshing and nourishing.

My second mountain was Kuh Bamu, to the north of Shiraz. Here I went on a picnic with the British Consul and his wife, and here I found my first cushioned dionysia, *Michavxi*. The cliffs were golden, so numerous were the flowers, and I gloated over the perfect green rosettes, tight and hard, each bearing beautiful golden flowers. Close to the summit in an upland valley, beside a tiny rill which sprang from below some delightful trees, we enjoyed our lunch and drank our fill from the spring and the rill in which countless frogs disported themselves.

From Kuh Bamu I drove in my old Ford along an unmade track to the foot of Kuh Ajub, a bare, barren mountain if ever there was one. Here I was received by the Chief and entertained to tea. The mountain sprang bare of earth and straight from the desert plain, so that the car could drive up to its very side and encircle it. Here grew, what to me was a beacon, the golden flowered *Dionysia Straussii* ; and I was lucky enough to find it, though it was extremely rare and only grew on sheer overhanging cliffs. Perfect rosettes of tiny leaves bore golden flowers in profusion. I visited the shrine of the Saint, and close by there arose a wonderful spring from which I quenched my thirst. On my return my guide sighted some mountain goats on the plain, and there started a unique hunt

in the car. So level was the plain that eventually we were travelling across the plain at over thirty miles an hour, but unfortunately the guide decided to fire from the racing car and missed all the goats !

From Shiraz I travelled over desolate country eastwards to the shores of the solid salt lake, and here I slept for the night in a fort. Next morning I had the unique experience of driving over the lake. The salt crust is as white as the driven snow, and as smooth, so that the car raced across at over forty miles an hour. As I approached Kerman I was amazed to see great mountain chains of over 8,500 feet with snow-clad peaks encircling the town. At the Consulate I received word that the Governor of Persian Beluchistan would allow me to climb the great volcano of Kuh-i-Taftan, so hiring a Persian chaffeur, a youth of eighteen and a marvellous driver, I hurried eastwards over the Lut desert. I slept the first night on the ground of a dirty room, and leaving early, spent the day crossing the desert. The heat was intense and the car repeatedly stuck in the sands and had to be dug out. This was no child's game and I was glad to eat mast and drink tea with the soldiers at their post in the middle of the desert.

After visiting the great watch tower of Nadir Shah and crossing a chain of mountains by a track so bad as to be almost unbelievable, I arrived at the post of Kuh-i-Taftan, where I was welcomed by the sergeant-in-charge. Soon the camels arrived and I was off to the great mountain. It was the first time I had collected plants from a camel and I found it extremely difficult to get off my ungainly animal ! I camped out at 8,000 feet and very cold it was. Next morning I was early afoot and found it a difficult climb to the summit at 13,500 feet. Here is a large fumarole from which clouds of sulphurous vapours ascended. The edges of the crater were lined with beautiful yellow crystals of sulphur. That night we sat round the camp fire, and aided by a Persian who had turned up accidentally, we ate a young goat which I had bought and which had been cooked in the cinders. It was delicious and the meal was a great success. On my way back to the Lut, we lunched by the side of a tiny pond and thoroughly enjoyed the cool water. Here I understood for the first time the love of the Persian for his streams, ponds and shade.

The plains round Hamadan were golden with the flowers of the Persian Rose (Rosa Berberidifolia).

The village at the foot of Jupar, an extensive range of bare cliffs and snow-clad peaks.

The crossing of the desert was as strenuous as ever and I was glad to reach Bam. Here I slept in the garage. Bam is a town of walls and few houses can be seen, for most are built in large gardens surrounded by high walls. I then made for the village of Jupar by almost impassable tracks. Here I picked up a local guide and drove across the trackless desert to the foot of the high mountain of Jupar. This range is of great extent and a wonderfully impressive sight with its bare cliffs and snow-clad peaks. I left at 3 a.m. one morning for the summit with my guide and when dawn broke was high up on a shoulder of the mountain. Jupar means " flowery," and this indeed is the flowery mountain. Many rare plants are to be found but of these the most beautiful is *Dionysia rhaptodes*, another golden flowered cushion plant. The cliffs above 8,000 feet are covered with huge green cushions of this delightful plant, which is easily the commonest on the mountain. From the summit a wonderful scene meets the eye. A veritable sea of high snow-clad peaks spreads round, all bare of trees and all relying for their beauty on their severity of line and simplicity of form. These mountains around Kerman would be a never ending attraction to a botanist.

Hurrying northwards to Yezd over the bare desert late one afternoon I saw, rising to the north-west,

the great peak of Schir Kuh, the "Lion Mountain of Persia." Taking a guide I hurried by extremely rough tracks to the foot of the mountain where I arrived at 11.30 p.m. Next day I spent a happy day climbing; many were the beautiful plants but the queen of them all was *Ionysia ianthina*, another cushioned beauty. Some of the cushions measured two to three feet across, and the cliffs were literally covered from 8,000 feet to the summit at 11,000 feet with these wonderful plants. The flowers were of bright pink and beautiful beyond belief.

My last climb was on the great mountain of Alvend which towers over the town of Hamadan. I arrived at a little wayside inn just below the mountains early one morning, and after having tea with several Kurds and vainly trying to understand them, I proceeded on my way to the high peaks above. The mountain has a rich and well-known flora and well deserves a visit. Roses, fritillaries, orchids, tulips, drabas, irises and many other flowers grace its slopes, but perhaps the finest flower of the mountain is *Primula auriculata*, which grew in thousands in the damp meadows, along the streams and by the melting snows. The mountain was bright with its pink flowers.

Persia is admittedly a difficult country to travel in; the language, the difficulties of sleeping accommodation, the bad roads, the food must tend to keep all but the keenest away. To the keen plantsman, however, the wonderful mountains and their delightful flowers will always be a magnet. To them the following lines are as an open book:

I never see a map but I am away
On all the errands that I long to do;
Up all the rivers that are coloured blue
And all the mountains that are coloured grey.
And into those pale spaces where they say,
Unknown!

Colony Founding Among Ants.

THE method by which new colonies of ants are founded is a problem which has aroused interest among entomologists during the past thirty years. The behaviour has been shown to be far more diverse than was suspected and closely correlated with the structural and physiological properties of the queen. When the fertilizer female establishes her colony and brings up her first brood of workers by herself, it is described as the independent method. But sometimes the task appears to be beyond her powers, and she invites the workers of an alien colony to help her and to act as host; that is to say, she behaves as a parasite upon other species. This is known as the dependent type of colony-founding, and it is to be noted that both these methods occur among the social wasps and bumble bees. There is a third type, swarming, when a detachment of the workers accompanies the young queen who sets forth to found a new colony, occurring only in polygymous, that is those where there is more than one female.

Professor W. M. Wheeler, while engaged on a recent expedition, paid special attention to the colony-foundation among the primitive Ponerine ants and succeeded in extending colony-founding one stage nearer the ancestral habits, showing that their method is an interesting link between the behaviour of the ants with that of the social and solitary wasps. He shows, too, that the queen has much more initiative than hitherto believed, which confirms the importance of the mother-family concept in the study of social insects. He has just written a remarkable book,* where the non-specialist will find much of interest.

The normal behaviour of a queen is to descend to earth after her nuptial flight and isolate herself from the world in a suitable cranny; her wings drop off and the large muscles degenerate to form a reserve of food, which with the abdominal fat-body accumulated during the larval stage is her capital supply of nourishment during the remarkable period of starvation which may last several months and has actually been recorded for 382 days. They are known to devour their own ova and to feed their young larvae with them during this period; and some observers consider this behaviour normal. This cannibalism enables the starving queen to prolong her life and, by sacrificing a portion of her family, to bring to maturity a small brood of active workers.

The author comes to the conclusion that the method of the higher ants, the claustral type of colony-foundation, is a specialized condition. If the capital supply of food fails, she has two alternatives: she may become temporarily parasitic upon other species, or she may sally forth and forage for herself. Here there is correlation between the behaviour and the relative sizes of the sexes. In the temporarily parasitic and slave-making ants, the females are of the same size as the workers, while in the independent groups the females are much larger.

**Colony Founding Among Ants.* By W. M WHEELER (Milford 11s. 6d.)

Contemporary Design—III.

Tendencies in Modern Sculpture.

By Alec Miller.

" To-day in art the authority of tradition is not only questioned but denounced, and every hitherto accepted standard is challenged." In discussing the trend of contemporary sculpture, the author suggests that nothing is so characteristic of the modern " movements " as the dread of resembling nature.

I THINK it is not using too large a figure of speech to describe Rodin as the watershed whence the course of modern sculpture divided. The term also implies that he was a landmark. At the opening of the century Rodin was almost universally acclaimed. The plastic realism of his modelled portraits is, in its way, triumphant, and in the best of them triumphantly successful. Twenty years ago to possess a picture or a reduction of that brooding pithecanthropos, miscalled " The Thinker," was the mark of sculptural culture ! Only gradually did we realize that this power of modelling, this sensitiveness to fleshly subtleties, was not enough : and to-day critical opinion has relegated him to limbo as a mere " emotional technician." He was a sort of Zola of sculpture, betrayed by the quality of his mind and by his constantly conceiving sculpture only in terms of clay. Yet he was, and remains, a landmark, though to-day submerged like most artistic landmarks.

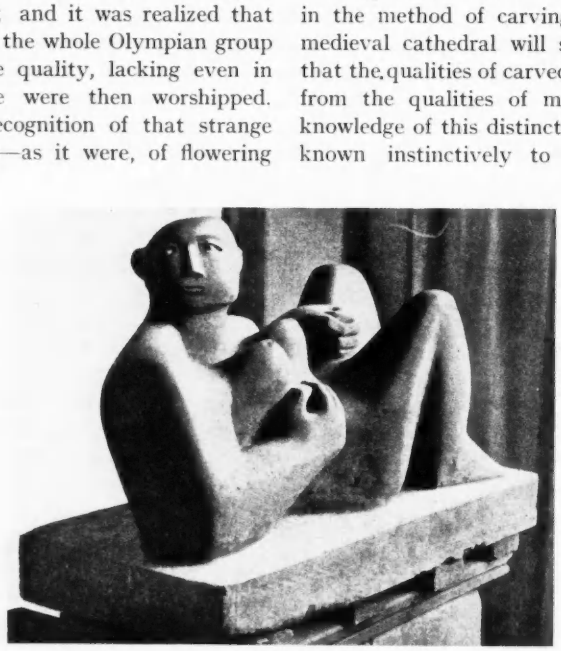
The artistic movements of the nineteenth century arose by a series of actions and reactions. The mid-century Pre-Raphaelite pursuit of truth in factual representation of form and colour was followed by the Impressionist's pursuit of truth in visual apprehension of atmosphere. The Classicism of Canova and Flaxman lasted long into the nineteenth century, and is seen even during the ' sixties ' in the vigorous and skilful carving of the marble frieze of the Albert Memorial. In the less than fifty years which separate this memorial from that of Queen Victoria, the romantic movement in sculpture arose, and culminated in Rodin : and incidentally the craft of the sculptor, as a carver of stone or marble, was almost wholly destroyed. Owing to the development and elaboration of the pointing machine during this time, carving became a reproductive, instead of a creative, process ; and sculptors were divided into two groups—those who conceived plastically, and those who translated these conceptions into stone with the aid of mechanism, a distinction which still prevails.

The reaction from Rodin's plasticities has now produced a group of sculptors who are so anxious to preserve the quality of stone that evidently they can hardly be persuaded to scratch the beautiful static block, lest something like recognizable form should be achieved. Nothing is so characteristic of the modern movements in art of the last thirty years as the revolt against representation, the dread of resembling nature. Yet the artist's eye is really the hunter's eye ; that quickness of observation comes to us from the time when " the grasp on the bow was decision, and arrow and hand and eye were one." The present-day pursuit of primitiveness has so often stopped short at the Neolithic man's art, rather than at Paleolithic man's art : perhaps because the latter is too realistic !

How interesting it is to trace, say, in the criticism of Greek sculpture, the gradual pushing backwards of the great period, the so-called apogee. At the beginning of the nineteenth century critics of Greek sculpture would have placed the Apollo Belvedere and the Medici Aphrodite (Shelley thought her " perfect " !) as the

A marble relief carving by Mestrovic, " the first giant of the modern carvers."

high-water mark : but presently this shifted a little, and the Hermes of Praxiteles and the Cnidan Aphrodite were hailed as the greatest works. Then came the discovery of the great nobility of the Phidian work, and the Theseus and the Parthenon work were definitely placed at the head of all Greek sculpture. But again there was another change ; and it was realized that the Apollo of Olympia and the whole Olympian group had some great distinctive quality, lacking even in Phidian work ; and these were then worshipped. The next step was the recognition of that strange vital fineness and delicacy—as it were, of flowering life—in the Apollo of Tenea and the Kore of the Acropolis. There is in these some sense of almost conscious power : the bloom of early morning is on them. But lately the newer critics have passed these, to point us to the power, the design, the volume (blessed word !) of the Apollo of Sunium and primitive sculpture : and so we are back at the point where Greek art took over the Egyptian tradition, and began to transform it.



" *Reclining Woman*," *in blue Hornton stone, by Henry Moore.*

And the latest expositor of modern sculpture has now pushed Greek art, not back into its Egyptian and Minoan origins, but " right off the map " : assuring us gaily that (a) there is no Greek sculpture, and that (b) what there is is only " ninepins with a sex appeal." All this seems traceable to the spirit which prompted Heine to say that the Greeks touched nothing which they did not vulgarize. One turns again to some chapters in " Culture and Anarchy," and to the realization that the world is still divided into Greeks and Barbarians !

But the distinction, so insisted on to-day, between modelling and carving, is indeed vital and cannot be lost sight of. About twenty or twenty-five years ago Mestrovic suddenly appeared, the first giant of the modern carvers. The critics explained some of the undeniable power of his work as due to " direct carving " ; and since then " direct carving " is the explanation offered for much primitive, and technically very inadequate, sculpture. It is no new process, invented by Mestrovic and Bourdelle and Eric Gill and Frank Dobson : it is as old as man, and predynastic Egypt. Not only are the, at present, much vaunted Negro sculptures " direct carvings," but so also are most Egyptian and Greek sculpture, and all the myriad sculptures of medieval Europe. The implication that archaism and crudity are inherent in the method of carving is sheer nonsense, as any medieval cathedral will show. Of course, it is true that the qualities of carved sculpture are quite different from the qualities of modelled sculpture : but the knowledge of this distinction is no new thing. It was known instinctively to every medieval sculptor : Goethe, with his insistence that all art is based on handicraft, seems to have grasped it in the eighteenth century : and it was stated with perfect clearness and finality by Ruskin in Lecture V of " Aratra Pentelici " in 1870.

That acute and analytical mind there gave a definition of sculpture as " the reduction of any shapeless mass of solid matter into an intended shape," and first formulated the theory that the aim of the sculptor is to achieve a " pleasant arrangement of bosses and hollows." The definition is elaborated, without much gain in clarity, in Wilenski's statement of the modern sculptor's creed. " Sculpture is the conversion of any mass of matter without formal meaning into a mass that has been given formal meaning, as the result of human will."

Here is Ruskin's distinction between modelling and carving. " Clay, being ductile, lends itself to all softness of line ; being easily frangible, it would be ridiculous to give it sharp edges, so that a blunt and massive rendering of graceful gesture will be its natural function : but as it can be pinched, or pulled, or thrust in a moment into projection which it would take hours of chiselling to get in stone, it will also properly be used for all fantastic and grotesque form, not involving sharp edges . . . The modern system of modelling the work in clay, getting it into form by machinery, and by the hands of subordinates, and touching it at last, if indeed the (so-called) sculptor touch it at all, only to correct their inefficiencies,

renders the production of good work in marble a physical impossibility. The first result of it is that the sculptor thinks in clay instead of marble, and loses his instinctive sense of the proper treatment of a brittle substance. The second is that neither he nor the public recognize the touch of the chisel as expressive of personal feeling or power, and that nothing is looked for except mechanical polish . . ." (Lecture V, " Aratra Pentelici.")

This distinction between the processes is still, sixty years later, quite inadequately realized and by some writers on sculpture is entirely misunderstood. The skilful craftsmanship of Eric Gill is essentially a carver's craftsmanship : and the influence of his technique in the fine series of the Stations of the Cross at Westminster Cathedral has been far-reaching. It looks a disarmingly simple kind of carving ; its mastery can be felt by anyone who has essayed marble relief carving. But it is mastery deliberately restricted to a narrow field and an arid manner. The restraint in using the relief, the almost entire absence of facial expression, separate it by worlds from the Stations by any Gothic carver—Veit Stoss, say, or Bruggemann, who concentrated on facial expression and revelled in costumes and intricate compositions. Again, Gill keeps most of the relief near to the surface of the panel, a true carver's technique. A modeller's technique would keep most of the relief near the background, and only occasionally, and at a few points, touch the high surface. Carved relief begins from the surface : modelled relief begins from the background. Gill refuses to use perspective and pictorial composition, as it is used, for instance, in the superbly accomplished relief by Dalou, of the Duc de Brézé and Mirabeau—which is really a picture in three dimensions, and theoretically should not succeed : yet it has such dramatic force that one is left breathless and conquered.

A modern carving in stone by Eric Gill.

This sort of appeal Gill entirely rejects, and offers us instead an austere simplicity ; though it is a simplicity that is more apparent than real. The beautiful accomplishment of his work may be studied in the Tombstone in the Tate (lent by Mr. Oliver Lodge) : though it is hard to reconcile this with his crucifix in the same gallery, in which he has deliberately adopted an artless technique which looks affectedly childish. Only a Blake or a Shelley could make a work of art of such naïve simplicity. If anyone cares to see at a glance the difference between a true sculptor's handling of marble and a modeller's reduplication of his clay, there are, almost side by side in the Tate Gallery, an unfinished " Clytie " by Watts and a bust of Henry James. Notice the edginess to Watts' contours, the firmness of planes, even though his carving in unskilful. And compare this with the other bust, whose marble looks like white clay miraculously petrified, though the skill of the carving is far greater. The fact that a group of sculptors have followed the archaic manner of Eric Gill has tended to associate archaism with carving : but the emphasis laid by Gill and his followers on doing one's own carving, and not delegating it to subordinates and machinery, has been wholly beneficial ; and much good work has been done, reaching, to my mind, the highest point in Gill's large stone torso, curiously entitled " Mankind."

One great result of the newer emphasis on carving has been to make it clear that technical questions are never merely technical, but involve ethics and aesthetics, and are really matters of artistic probity. The issue also arises in the case of bronze treatment, and modern sculptors are clearly divided in the treatment of metal. The most logical modern example of truly metallic treatment is Dobson's bust of Osbert Sitwell in the Tate, which is consummately skilful : and except that it is polished so highly as to be somewhat " brazen " in hardness of contour, it resembles Egyptian or early Greek bronzes—a quality almost unknown in any nineteenth century bronze work. From the smooth and accomplished suavity of academic bronzes to the coarse and somewhat repellant vitality of Epstein's modelled bronze heads, sculptors have mostly been content to let bronze be merely a permanent reduplication of clay. Some

contradiction is here involved : and to my mind the most beautiful metallic treatment is to be found in Egyptian and Greek bronzes. The bronze head from Beneventum in the Louvre, or the similar ones in Munich and the Ashmolean all show that, to a Greek, a head in bronze was not merely a reduplication of a clay or a marble original, but an entirely different problem. And the medieval makers of gilt latten effigies (notably Torel at the end of the thirteenth century and the maker of the bronze " Beauchamp " in Warwick) also used bronze with a beautiful distinction from contemporary work in stone or marble.

Treatment of Bronze.

Dobson himself seems to be undecided as to the true treatment of bronze, as his so-called " Truth " and a small torso (also in the Tate) are entirely clay-like. But it seems likely that a new sculptural technique for bronze will be evolved, and that it will be such as will preserve the metallic yet ductile quality implied by the material and the process. There thus arises out of these processes certain stylisms, and these stylisms tend to be regarded as representative of a school or a group of sculptors, rather than as the result of the process and material. True style should arise unconsciously. The consious harking back to an antique manner, as in the Archaistic Revival of Greek sculpture or the Saitic Revival of Egyptian sculpture, lead almost inevitably to a false stylism which is unsatisfying. Style is the very essence of a work of art : and to dismiss work because it is " stylized," or even " distorted," is surely dangerous. Some recent writers on art seem to imagine that the search for what might be called the " stream lines " of the human body, and for the expressiveness inherent in different materials for sculpture, wood, marble, bronze, is a new phase in the course of sculpture. Actually it is as old as paleolithic man and ancient Egypt.

Egyptian stylization was partly ritual, like chanting instead of speaking ; and partly it arose almost unconsciously out of the materials employed and the scale of the work. The smooth simplifications of their work in granite and basalt are quite different from their work in limestone or wood. Primitive Greek stylism was, I think, quite unconscious. Those ears like question-marks ; the rows of tufted curls arranged geometrically ; those large innocent eyes, anatomically so untrue, yet so like a child's idea of an eye ; the quadrature of the figure, due to the simple process of drawing the front and the side views of the figure on the respective sides of the block and cutting through till they intersected ; all this produced unconscious stylism ; and even though noble work was done in that manner, it cannot be copied without fatal affectation. The distortion of the kings and queens of Chartres was a deliberate adaptation of sculpture to architecture, and is found only for a relatively brief period, which led up to the lovely spiritualized realism of the thirteenth century sculpture.

To say of Epstein's " Rima " or " Genesis," Dobson's " Truth " or Henry Moore's " Mountains," that it is " distorted " is obviously no answer to their challenge, but such work can be challenged on the ground that their stylism does not arise out of the necessities of the material or of their architectural setting. The statement made and repeated in defence of the concave negroid face of " Genesis," that it was " demanded by the necessities of design " or " demanded by the pattern made by the convexity of the body " is just an evasion. There is no such tyrannous spectre as this design. And to the quite legitimate theory that sculpture is only a series of related masses, and need not necessarily have meaning or resemblance, one can only reply that the works themselves confuse this issue by having some resemblance to the human or sub-human species.

Maillol has achieved a noble simplified stylism of the female figure by a lateral amplitude of form, a certain titanesque quality which has affinities with the quiescent energy of Michael Angelo. Kolbe has simplified and stylized his figures by attenuation, and yet has achieved beauty. Carl Milles' female figures, with all their forms made up of flattened convexities, give a sense of abounding energy and vitality, and yet of great beauty. Brancusi, pursuing the simplification of the body to the n^{th} degree, has produced a cylinder with two smaller cylinders at the lower end, resembling a jointed drainpipe ; and he calls it a torso. Now in a sense it is true that the human torso is only a drainpipe : but it would seem both more logical and easier to begin with the cylindrical drainpipe, than to arrive at it by the long and tedious process of eliminating all contours till such simplification is reached.

" Abstract Beauty."

Some notable experiments have been made in abstract form and a certain adherent beauty may be reached in this way, but this is akin to that beauty which comes from perfect functioning, say, in an engine or an aeroplane. This beauty is true enough : but it is essentially different from the beauty which moves us, like great poetry, in the Demeter of Cnidus, or the noble Kephren, or the San Lorenza Madonna.

The statues are also, like abstract sculpture, "a series of related masses": but the alchemy of the artist has transmuted and transcended the material. These works are filled with the peace beyond all reason, the perfect calm of the spirit. Behind the transitory and the individual, the sculptors have shown us the eternal and the universal: and, contemplating them, we (as Spinoza says) "see things in their eternal aspect, and so participate in Eternity."

Few of the achievements of modern sculpture can move us thus profoundly. And after a visit to the Leicester Galleries, or a study of the recent additions to the Tate Gallery, and even more after reading the incredible explanations offered by the critics of these, one turns with a sense of real relief to such apparently simple theories of beauty as Aristotle's: "Beauty is a matter of size and order." How easy it would seem then to achieve it! In discussing the literary criticism of Horace and Aristotle, Professor Abercrombie throws out the wise remark: "A sound philosophy of art is nothing but a rational account of good taste." How salutary is such simple wisdom! And further: "The rage for extreme individualism provoked in Horace his sturdiest conservatism; and his determined assertion that a poet must be a rational being, and poetry a rational art, is not the least of his services to sound criticism."

(Left) "Mother and Child" by Epstein, compared with (right) a Negro carving in wood of the seventeenth century.

To-day in art individualism is supreme. The authority of tradition is not only questioned, but renounced and denounced. The sense of discontinuity is not only obvious, but is loudly proclaimed. Every hitherto accepted standard is challenged. A new architecture has been created in the last thirty years, defiant of tradition and made possible by the new materials for building—iron, concrete and glass, but no new materials have been discovered for sculpture: we still employ only the media used for five thousand years in ancient Egypt. It is true that an attempt is occasionally made to use aluminium as a new material for sculpture; but in appearance it hardly differs from silver, and in treatment it can only be used in the same way as bronze, brass or copper.

We are often told to-day that, to the perceptive sensitive artist, the block of stone or the tree will suggest the form and contours of his sculpture. "He will consider how stone has reacted to natural forces like wind and water, for these in course of time have revealed the inherent qualities of the stone. Finally he will ask himself what form he can best realize in the particular block of stone he has before him. . . The sculptor's act of creation is, as it were, a four-dimensional process, growing out of a conception which inheres in the mass itself. Form is then an intuition of surface made by the sculptor imaginatively situated at the centre of gravity of the block before him." (Herbert Read.)

It is hard to see how this kind of writing explains anything; much less how it explains the sculpture by Henry Moore, of which it purports to be an explanation. It merely states in pretentious words the fact that different kinds of stone have different qualities. Stones are simply the material from which art is created, just as words are the material from which poetry is made. The sculptor's use of stones is to shape them, or the architect's to arrange them, with meaning and beauty, and thus to give form to feeling. Isolated words have no meaning except in philology; isolated stones have no meaning or significance except in geology: though both words and stones may have their own beauty.

The Spinx, the Colossi, the Apollo of Olympia, the Dawn of Michael Angelo all keep the sense of stone, at least as clearly as does the work of Mr. Moore. And these artists did not walk round their blocks of stone and wonder what they might half resemble.

Instead of defying the past we should seek to understand it: not, indeed, to imitate the forms of past art, neither Greek nor Negro; but rather to initiate forms as true, as moving, and, let us hope, as beautiful. This transmutation from the past, from nature, and from our experience, is the artist's high privilege; for thus do we create art from the intuitive perceptions of the spirit, and give it form by the wisdom of our hands.

Christmas in the New Zealand Alps.

By H. Z. Collier.

Entries for our travel competition included several essays from our readers overseas. The second prize is awarded to the author of this article who describes a holiday off the beaten track in the New Zealand Alps.

WHERE shall we go for Christmas? This is the question asked by countless New Zealanders when spring has arrived and plans are made for the summer holiday. New Zealand offers endless attractions. Many favour the white sand beaches of the seaside, others seek the wonders of the hot spring district, fishermen find joy in our noble trout and salmon rivers, and motorists tour the splendid scenic routes from end to end of the country. But for some the call of the high mountains is irresistible. To four of us who have spent many holidays together exploring the remote valleys of the Southern Alps, this call comes every year.

If you look at the map of New Zealand you will see close to the western coastline of the South Island a long backbone of mountains, the Southern Alps. At the highest point Mt. Cook raises his head 12,349 feet above sea level, while there are many peaks of 9,000 feet from end to end of the range. At Mt. Cook there is a luxurious hotel, but for the most part, those who penetrate this mountain region must carry their own tent and provisions. This we did during the week between Christmas and New Year, when we followed the Matukituki river to its source.

The first day's journey from Dunedin to the starting point of our tramp was by train and bus through one of the dryest but most interesting parts of New Zealand. The bush green grass and crops of the East Coast soon gave place to silver brown waving tussock land, and then to the semi-desert of Central Otago. Here the bare land patchily covered by flat "scab weed" looks horribly diseased till irrigation water makes possible fruitful orchards and prosperous farms. The railway ends at Cromwell, once the centre of great gold-mining operations which are even now being revived. A further forty miles by bus brought us to Lake Wanaka, upon whose shores we camped. It was Christmas Eve. Beyond the cold clear waters of the lake rose the first outlying ridges of the Southern Alps, broken by the broad V of the valley of the Matukituki which, entering near the lake's southern end, is its largest feeder.

We were able to hire a car to take us next morning to a point thirty miles up the valley, where the river forks, and beyond which no car can possibly travel. Indeed, it is amazing that any car can hold together even over the thirty miles of the lower valley. After following the lake side for several miles we rounded a rocky bluff and the beautiful curve of Glendhu Bay and the Matukituki valley itself lay open before us. There, away in the distance, up the valley, the cold icy summit of Mt. Aspiring (9,950 feet) rose in splendour above lesser peaks and ridges. The Matukituki has its source in the snowfields and glaciers of this mountain, which was thus our goal, and this first view of it in the clear morning light of a New Zealand Christmas Day seemed a good omen and an inspiration.

For the next ten miles the road was passable, but after that we followed a rough track across open grasslands and through clear shingly streams flowing to a swift river on our right. At the junction of the East and West branches of the river we left the car, which looked strangely out of place amid the otherwise unmarred beauty of nature. Straight ahead Avalanche Peak displayed its vast field of glittering blue-crevassed ice, and at its base close to the forest margin was discernible a small white homestead, the Mt. Aspiring sheep-station. To this isolated spot, sometimes completely cut off for several weeks, a New Zealand soldier brought a Liverpool girl as his wife after the war, and here they have proved the spirit of the

A part of South Island, showing the author's route in the New Zealand Alps.

pioneer is not yet dead. Our plan was to follow the West branch of the river to its source, and pack-laden, we were soon scrambling along the rocky side of a narrow gorge through which this branch debouches upon the flats of the lower valley. Our tramp was fairly begun and though our packs were heavy, we pushed on upstream with light hearts.

At the upper end of the short gorge the valley widened to grassy flats between precipitous mountain walls streaked by the white ribbons of waterfalls which, as in Tennyson's "Lotus Eaters," "to fall and stop and fall again did seem." On the river flats feed herds of semi-wild cattle which the run-holder rounds up annually in order to select animals for driving to market. Upon first acquaintance these are rather terrifying brutes for they rush up close to the traveller, but always stop and stare when about one hundred yards away. After satisfying their curiosity they usually turn tail and bolt in the opposite direction, to the great relief of nervous members of the party.

Ranunculus Lyallii, said to be the finest buttercup in the world.

A mile or two up the valley the way led over some hummocks from which we saw the splendid roughly broken icefields of the Rob Roy glacier high up on the north wall of the valley. The surging torrent descending from the glacier is laden with fine glacial mud which gives the main river below this point a curious opaque milky appearance in strong contrast to the clear waters of its upper reaches.

From this point on, the valley began to bend to the north and new scenes of grandeur were unfolded. At the bend, on the left hand, was the tussock-covered Shotover Saddle which is only 4,000 feet high, and leads over to the headwaters of the Shotover River. This offers another route of approach to the upper Matukituki, starting from the popular tourist resort of Queenstown, on Lake Wakatipu.

Ahead, showing over the black precipices of Cascade Saddle between Mt. Tyndall and the rounded summit of Plunket Dome rose the magnificent ice peak of Mt. Edward (8,700 feet), one of the most lovely and most difficult to climb of New Zealand mountains. Hitherto the sky had been blue and cloudless, but now the high peaks to the north were blanketed in fog carried by the west wind. Mt. Banff (7,700 feet), the last peak in sight, was a fine spectacle of glistening snow and a creeping white canopy of fog.

We camped that night on the far bank of Cascade Creek, a turbulent mountain torrent which had to be forded carefully to avoid slipping on the rounded boulders beneath its cold waters.

We pitched our tent on a grassy terrace where there was a good supply of fern for bedding. As we ate our Christmas dinner of soup, wheaten biscuits, cocoa, and a small plum pudding (brought specially for the occasion, in spite of its weight) fog was thickening on the peaks. In the New Zealand Alps the west wind is the trampers' enemy as it almost invariably brings a rainy period. The increasing breeze gave little promise of a fine dawn as we rolled into our blankets, but sleep soon banished all misgivings. We woke to the patter of rain on the tent and the slow drip from the overhanging branch of a beech tree.

Next morning was sparkling clear with a white frost on the ground. We were up and had our swags packed when the sun had no more than touched the snow peaks round us with rosy splendour. A mile from camp the beech forest spread right across the valley, but a well defined trail used by cattle led through it to grassy flats beyond. This is alpine forest so that the trees, which are for the most part New Zealand silver beech (*Nothofagus Menziesii*), are not of great size, but they are made beautiful by festoons of moss and ferns which also carpet the ground.

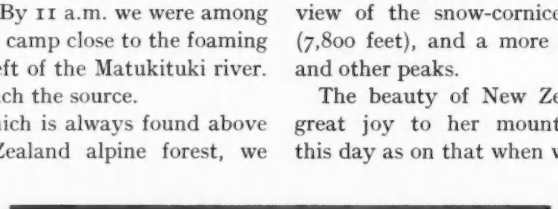
Where rushing creeks make the narrow openings in the forest grow mountain ribbonwoods (*Hoberia glabrata*), trees whose light green foliage and large snowy white flowers make a striking contrast with the sombre beeches. One such large creek in this stretch of bush gave us some trouble to cross, as we had to jump from one slippery boulder to another over a raging torrent, no easy task with a pack of 40 lbs. on one's back.

As we emerged from this band of bush we had a magnificent view of Mt. Aspiring (9,950 feet), with its glistening ice peak high above the dark shadows of the Matukituki Valley. It was a sight never to be forgotten. A grassy slope spangled with small native daisies (*Celmisia gracilenta*) stretched to the swift flowing river beyond which the dark forest and

precipices of bare rock rose to the ice-fields and conical peak of Aspiring bathed in pale golden sunlight.

This grassland is known as Shovel Flat and beyond it we had to pass through a further stretch of forest for the most part without a track of any kind. But with a leader experienced in this type of work, beech forest is not very difficult. By 11 a.m. we were among alpine scrub, and we pitched camp close to the foaming stream which is all that is left of the Matukituki river. After lunch we set out to reach the source.

Beyond the scrub-belt which is always found above the upper edge of New Zealand alpine forest, we crossed moranic hummocks of rocky debris and came to the head of the valley which was blocked by high black precipices, except at one point where the stream came pouring in a cascade from a snow-filled gulch. Here, at about 4,000 feet the climbing became steep. This was the first real snow we had encountered, though we had passed several large piles of avalanche material not yet melted since the great slides of the spring. The gulch led us to a wide snow basin surrounded by high peaks.



The summit of Mt. Islington, one of the magnificent peaks in the Southern Alps.

Right ahead lay our goal, the Matukituki Saddle, above a long easy snow slope. A west wind again brought fog drifting over the summits, but from the saddle, which is 5,000 feet, we looked out on a splendid panorama. The far side of the saddle fell abruptly in a loose precipice to the Waipara Valley, down which crept the wrinkled tongue of the Bonar Glacier after its steep descent from the hidden heights of Mt. Aspiring. Beyond the valley towered a range of splendid peaks, their beauty enhanced by shining banners of fog. To our right the face of Mt. Bevan ran up in steeply sloping bare rock slabs and behind us lay the upper Matukituki Valley, from which we had come. We descended rapidly as it was essential to be on the lower hummocks before the fog enveloped everything.

The next day was again wet, but we moved camp back to Shovel Flat and beneath overhanging rocks were able to pitch the tent so that we could move about and dry off before a big log fire. But we were glad when next morning dawned clear and bright. Two of us determined to climb the lower slopes of Plunket Done, but as we were late starting, it was extremely hot work on the scrub covered faces and rocky bluffs of the ridge we chose. We reached no great elevation but were high enough to have a magnificent close-up view of the snow-corniced summit of Mt. Islington (7,800 feet), and a more distant one of Mt. Aspiring and other peaks.

The beauty of New Zealand's alpine flowers gives great joy to her mountaineers and trampers. On this day as on that when we climbed to the Matukituki Saddle we saw many of the most beautiful and a few of the rarer species. Most lovely of all was *Ranunculus Lyallii*. This buttercup, which is said to be the finest in the world, has large saucer-shaped leaves which may be used as drinking cups. Its flower stems, standing two feet high, bear ten to thirty flowers, each perhaps one and a half inches across, pure white with a golden yellow centre. The various species of mountain daisy (*Celmisias*), several members of the canot family including the spear-like *Aciphyllas*, and low growing heaths (*Saultherias*) were numerous on the snow-grass slopes above the scrub.

We were back at Shovel Flat early, and the same evening we moved camp to our old site at Cascade Creek from whence next morning we tramped to a sheltered gully below Shotover Saddle, and there pitched our tent for the last time in the wilds. The steep but easy ascent to the saddle was climbed rapidly as again bad weather seemed imminent.

New Year's Day was the last of our holiday. It was clear and hot, and we tramped down the valley to the point where we had arranged to meet our car under ideal conditions. We pitched our tent that night in the public camping ground at Wanaka, and from the comfort of their smart caravans motorists looked with pity at our tiny tent. But few of them would be privileged to see the rose-coloured glory of sunset on close-by snowy peaks or to sleep amid the silence of the mountains, a silence intensified by the swishing chatter of a nearby stream or the occasional rumble of an avalanche.

Book Reviews.

The Empty Quarter. By H. St. J. B. Philby. (Constable. 21s.).

Arabia is one of the last countries of the world which offers to the adventurous any considerable tract of territory still unexplored. Within the last three years its great southern desert has been crossed twice—by Mr. E. S. Thomas in 1931, and by Mr. Philby in 1932. In a period of ninety days Mr. Philby traversed Arabia from east to west, covering 1,800 miles of the most inhospitable region of its barren lands, the Rub' Al Kali—" the Empty Quarter " as the Arabs call it. This country had not previously been explored scientifically, and a great part of the route was unknown even to the author's Arab guides. The expedition was undertaken with the patronage and assistance of Abdul Aziz ibn Saud, King of Arabia. It may be regarded as the first scientific expedition undertaken by the Arab Government, and its success should serve as an incentive to further official encouragement of scientific exploration, for which Mr. Philby's expedition has paved the way. For his journey was not merely a feat of very considerable endurance which added much to topographical knowledge of this part of Arabia ; in making very appreciable additions to knowledge in other branches of science, it raised a number of problems which urgently call for further study.

The collections made by Mr. Philby, geological, palæontological, zoological, entomological, and botanical, are discussed in appendices by specialists. Of these, one, that by Dr. Spencer of the British Museum on meteorites and fulgurites, arises out of what was perhaps the great disappointment of the expedition. One of the objectives was a rumoured site of an ancient ruined city, which the Arabs claimed to know. The ruins proved on inspection to be twin craters made by meteorites. The archæologist's loss is the mineralogist's gain, in view of the rarity of such craters. Mr. Philby's specimens of meteoric iron and fused sands have, as Dr. Spencer shows, provided much valuable information relating to the action of meteoric manifestation. The archæological results, a bronze arrow head and a number of neolithic implements, may seem meagre ; but they are none the less important. Taken in conjunction with palæontological and geological evidence, they point to a civilization in this area, possible associated with, or perhaps preceded by, more favourable climatic conditions, dating at about 5000 B.C.

The fascination of unknown Arabia has called for their best in energy and endurance from travellers who have deserved the epithet " great," and it has inspired great narratives of travel. Mr. Philby by his achievement, and his book by its sustained interest and graphic style, may deservedly be added to this band of the select.

Sport and Exploration in the Far East. By STEN BERGMAN. (Methuen. 10s. 6d.).

Dr. Bergman, a Swedish naturalist and traveller, records in this volume his impressions of a visit to the Kurile Islands, a chain north-west of Japan. This is the home of a rapidly vanishing race—the Ainus. The islands are infested with three plagues, alder and pine thickets and bamboo grass, which combine to make progress through the country extremely difficult. The bamboo grass grows to more than a man's height and occurs in " thick mats." At one point, Kobune, the author encountered other difficulties : " There was a riot of giant vegetation, and at times we were completely buried in sappy angelica and other plants. Whenever we were held up we had to engage in a strenuous fight to save ourselves from being bitten to death by the midges, mosquitoes and gadflies which accompanied us in clouds." In the neighbourhood of the Chiripoi volcano the author explored the cliffs to study something of the bird life there. Guillemots and kittiwakes make their home in great colonies. Higher up on the grass patches, tufted puffins have their nests in deep holes which they themselves dig in the ground.

Archaeological discoveries have made it clear that the Ainus were formerly distributed over a wide area in Japan. In the course of centuries, however, they were forced more and more towards the north, and now they are to be found only on Hokkaido, on the Kuriles and on Sachalin. In all they number about 20,000. Different views have been expressed as to their origin ; they live in the midst of a Mongolian race but have no Mongolian characteristics themselves, and most anthropologists agree in regarding them as belonging to a Caucasian race.

An important native festival is the bear-feast, a singularly brutal observance, marked with extravagant ceremony. The bear plays an important part in Ainu religion : he is regarded as a god and the author says that he is honoured in many ways. The bear-feast, however, is an honour which the diety might well be glad to forfeit. All taking part in the ceremony are attired in their " holiday clothes," and a great many staffs and chips are set on the ground. When the feast is to begin, one of the elders addresses a speech to the bear, which is then hauled up by a rope and irritated by being shot at with sharp arrows. It is subsequently strangled and the flesh is eaten.

Backwaters of the South Seas. By EVELYN CHEESMAN. (Jarrold. 16s.).

Miss Cheesman's excellent book on her two years' stay in the New Hebrides, mainly in the island of Malekula, shows once again that the traveller who has a definite purpose in view learns far more about a foreign country than the mere tourist. Miss Cheesman is an entomologist. She went to the New Hebrides to continue her study of the insects peculiar to that group, and in doing her work she roamed all over Matekula, passing unharmed among very primitive savages, many of whom are cannibals and who are rarely visited by white men. It says much for Miss Cheesman's courage and tact that she soon gained the confidence of the wild tribes and found that they had placed a *tambu* on her, making her, as it were, sacrosanct and untouchable like the things of the gods. So potent was her *tambu* that it covered her companions—not merely a white trader who went with her to visit Ringapat, the chief of the Big Nambas, but even her native porters who would otherwise have been afraid to venture beyond their own districts. She does not idealize her native acquaintances. They are very dirty and very ignorant and, like most Melanesians, compare badly with the refined Polynesians of Tahiti and Tongu. But Miss Cheesman soon found that even the dreaded Big Nambas are by no means irrational and that they are ruled by a religion of fear—fear expecially of the disembodied spirits of the dead who can most surely be disposed of when the bodies are eaten. In their relations with white men they are influenced by the memory of the past treachery and oppression of scoundrelly " blackbirders," or recruiters of labour for plantations in Queensland and elsewhere. Miss Cheesman says that some twenty years ago a half-caste recruiter induced two Big Nambas to

sign on for two years. They never came back, and the customary offering to their village for the loss was not made. The Big Nambas nursed their vengeance for twelve years but when the recruiter again appeared, thinking that the matter was forgotten, they killed him. Miss Cheesman justly observes that such an episode does not prove them to be untrustworthy. As to cannibalism, she thinks that the influence of the younger men, especially those who have worked for Europeans, is hostile to the practice, but the older men, and especially the sorcerers, adhere to the old custom. The much abused sorcerer, she declares, has great economic value as a maintainer of law and order. If the tribal council passes a capital sentence, the sorcerer tells the culprit that at such and such a time he will die—and he dies accordingly from sheer fright. Oddly enough, Miss Cheesman noticed that, though the pagans live like animals, their villages are in a better sanitary condition than the mission settlements, seemingly because they allow pigs to roam about anywhere while the missionaries do not. The book abounds in such interesting and suggestive comments.

Malekula, one of the larger islands of the group, abounds in the insect life which concerned Miss Cheesman, but it has no special charm of scenery, except on the coast. The interior is mainly wooded and the trails are bad, so that travel is hard and it is difficult to see very far. Miss Cheesman set out to climb Mount Penot, some 4,000 feet high, in the centre of the island, and found herself on another mountain of about the same height which is not shown on the map. Evidently inland Malekula has seldom attracted the surveyor. The people are much more interesting than their island, and one could not wish for a plainer or more sympathetic account of them. The book is well illustrated with photographs of the natives and has two rough maps. But it lacks an index.

Hidden Africa. By ATTILIO GATTI. (Hutchinson. 18*s*.).

Commander Gatti was the leader of the Italian Scientific Expedition from the Cape to Cairo. It lasted two and a half years, "zigzagging back and forth into the remote and impenetrable parts of Africa," visiting her civilized centres, covering 35,000 miles by motor and over 6,000 miles by foot and canoe. His account is rich and varied, crowded with incident and adventure, and sometimes with noteworthy discoveries.

Writing of Zimbabwe, "city of silence and mystery," the author deplores the reckless pillage of tourists and commercial interests which has proved so disastrous for the serious student. He relates how Professor McIvory, in the course of excavations, found some pieces of porcelain of the fifteenth century. Naturally proud of his discovery, he based upon it an impressive theory of a Mongolian origin of Zimbabwe in mediaeval times. But soom his illusion was shattered by another investigator who, having gone to a lower depth, unearthed a bottle of soda water of British make! After studying the results of the many expeditions to Zimbabwe the author visualizes the country as he believes it must once have been, when the whole region between the Limpopo and the Zambesi was inhabited by millions of Bushmen and animated by long processions of these small black men working and toiling over an area of 700 by 900 miles. "Under the hard whips of foreign overseers, with strange faces and strange habiliments, who had made hopeless slaves of them, they laboured in disciplined squads to realize the magnificent and inexorable plans of the invaders. So, in all the strategic points of the country were built constructions, differing in dimensions but always of the same type, which combined the purposes of smelting places, temples for the religious ceremonies connected with the manipulation of the metals, and fortresses for defence."

Contingents of Bushmen picked up and broke into regular brick-shaped pieces the hard granite. Others transported these thousands of tons of broken granite, often extracted from a quarry several miles distant, to the tops of hills two or three hundred feet high and very difficult to climb. On the hilltops, the Bushmen, who were the best trained and most skilful workers, took charge of the granite "bricks," and under the supervision of their lords fitted them together to form those marvellous, time-defying walls which, although constructed without any mortar or cement, are so expertly built that it is often impossible to insert the blade of a knife between one stone and another.

In this way came into being the fortresses of Tati and Mombo, on the banks of the Sabi and the Impakue rivers; Matindela, Chilurwe, Mazoe, Metemo and about two hundred others. And in them the traders who controlled the extraction and manipulation of the ore in all the surrounding territory lived and maintained their headquarters.

Writing of the fall of Zimbabwe the author suggests that perhaps the serfs rose up against their oppressors and slew them. Or some devasting plague came which destroyed both masters and bondsmen. Or another barbaric people, strong in numbers and knowledge of warfare—perhaps the Bantu, then at the height of their power—invaded the country, seized and carried away all the wealth they found there, annihilated the rulers and expelled from the country the slaves; beginning that ruthless persecution which has continued throughout the centuries, oppressing, decimating and driving the Bushmen from one country to another until they were reduced to the miserable, degenerate remnant which to-day can be found only in the barren Kalahari Desert. This last hypothesis seems to Commander Gatti the most plausible, for while no deposit of smelted gold was ever discovered in Zimbabwe, golden ornaments of every kind were found in a certain abundance during the different excavations both in the acropolis and the city. A thousand ounces of gold the treasure hunters have found in all at Zimbabwe, but only in the form of ornaments—ornaments broken and smashed as if the men who wore them had fought and perished to defend their city, which has remained throughout the ages as an anonymous tribute to their skill, intelligence and stupendous labour.

The Celtic Peoples of Renaissance Europe. By DAVID MATHEW. (Sheed & Ward. 18*s*.).

This able study of Celtic and Spanish influences on Elizabethan England is based principally on the series of state papers and on the various private collections of sixteenth century manuscripts which contain so much of the extant data concerning the political and social life of the period. It is also in the light of these personal memoranda that the effect of the religious changes and the conflicting cultural standards can best be viewed. Father Mathew points to the fading of the old conceptions, the lingering effect of the mediaeval background, the altered attitude of Spain, which are so clearly reflected in these documents. Spain itself, in the comparative stability of the national outlook and policy, provides a rough index of the changes in England; while the persistent strength of the anti-Spanish sentiment and its rapid growth can only be understood in the light of the relations between Spain and those Celtic countries which were bound, either with enthusiasm or

with reluctance, to the Tudor rule. "With Spain was bound up the new European military tradition." As Father Mathew points out, continental influences in England appear most clearly in the profoundly secular court of Elizabeth, where a gulf had widened between the insular traditions of the squirearchy and the atmosphere of a "transient overwrought culture" in the highest strata of the nation's social life. To all these influences, English and continental, the vague term Renaissance can apply, suggesting the antithesis of Mediaevalism, while against them stand the alien Celtic nations with their weakening and pre-Mediaeval system of life. The author shows that it is in some measure a psychological problem which is presented by alterations of standpoint as gradual as they were complete: "The last influences of feudalism in the north, the reactions which were set up by the changes in Wales and Ireland and by the Highland Scots only reveal more clearly the new and strong centripedal forces. The old Celtic ties drew out: it was the victory."

Father Mathew follows the different elements in sixteenth century culture down to the roots in the regional life of the countryside and the characteristic social type that it produced: "Each such type—the English courtier and the Welsh squire, the Italian cardinal and the Tudor country priest, the Spanish noble and the Irish chief, the oarsman of the Western Islands and the Cornish pirate—has its own social tradition and its own spiritual world. They are to be seen not as picturesque figures in an historical pageant, but as representatives of social tradition which are also spiritual forces: and it is only when we have grasped the complex process of cultural and religious change, set up by the interaction of these forces and traditions, that we can understand the true significance of the great historical crisis which determined the fate of the Celtic peoples of the sixteenth century."

Students of this significant and fascinating period in English history will welcome Father Mathew's scholarly study. It is both an historical analysis of importance and a work of literary merit.

Yugoslavia. A New Country and Its People. By GRACE ELLISON. (Lane. 12*s*. 6*d*.).

"To me," writes Miss Ellison, "Yugoslavia was a revelation. From what I had read I expected little; yet how could anyone with an open mind travel through that beautiful country and not return enthusiastic?" The author describes it as a land where east meets west, where one can still enjoy the charm of the Orient yet remain in Europe. Miss Ellison writes entertainingly of the folk lore, costume and music of the six parts, all essentially different, which now form a united kingdom. Slovenia, with its famous Julian Alps, has a special appeal for the mountaineer; southern Serbia offers architectural treasures to the student of Byzantine art; Belgrade, Montenegro, Dalmatia ("the new European riviera") have their own unique attractions. The author includes pen portraits of many outstanding Yugoslav personalities, among whom King Alexander himself is perhaps the most vivid.

The House of Mankind. By HENDRIK VAN LOON. (Harrap. 12*s*. 6*d*.).

Mr. van Loon has set a new style for the geographers: whether it is a good one is perhaps a matter of taste. His object is to give a correct "impression" of the relation of man to the earth which he inhabits. Accuracy of detail both in the text and in the author's drawings is sacrificed for effect with quite startling abandon. The author shows a complete disregard for proportion. He certainly achieves his "effect," but the value of the impression which the book gives is questionable: "It sounds incredible, but nevertheless it is true. If everybody in this world of ours were six feet tall and a foot and a half wide and a foot thick, then the whole of the human race could be packed into a box measuring half a mile in each direction. If we transported that box to the Grand Canyon of Arizona and balanced it neatly on the low stone wall that keeps people from breaking their necks when stunned by the incredible beauty of that silent witness of the forces of Eternity, and then called little Noodle, the dachshund, and told him to give the unwieldly contraption a slight push with his soft brown nose, there would be a moment of crunching and ripping as the wooden planks loosened stones and shrubs and trees on their downward path, and then a lower and even soften bumpity-bumpity-bump and a sudden splash when the outer edges struck the banks of the Colorado river. Then silence and oblivion." Geographers may question the value of this approach to the subject. It is at least original.

Charles Parsons. By ROLLO APPLEYARD. (Constable. 15*s*.).

In 1854 the Earl of Ross wrote to the Chief of the Engineering Department of the Navy: "You are probably worried with conundrums for destroying the Russian ships: this is mine. To build an iron steamer, proof against shot, shells and boarders and to run at the enemy's ship and sink it with one blow of the cut-water. I think we can assume that three-inch iron plate would be shot-proof except at very short range, and where the impact was perpendicular. The funnel need not appear above the deck as a fan would answer instead. I have assumed 300 as the normal horse-power." Thirty years later his son, Charles Parsons, began the discoveries which ultimately solved the problem of the efficient propulsion of ships. He is now famous as the inventor of the steam turbine, and for his association with Lord Fisher in developing the "dreadnought policy." In 1904 Parsons began to assist the Admiralty with designs; in 1914 he saw the fulfillment of that part of his work, and at last the extension of it to facilitate transport, commerce, lighting, heating and power distribution no less than the general improvement in the material conditions of human existence. Mr. Appleyard does justice to the subject of his study in an eminently readable biography, with many interesting illustrations.

Egyptian Antiquities in the Nile Valley. By JAMES BAIKIE. (Methuen. 21*s*.).

The author, whose death occurred when the text was nearing completion, has followed the plan of the familiar travellers' handbook to Egypt in describing the antiquities of the country as they are encountered on the voyage up the Nile. Much more attention, however, is given to matters of detail, and each monument, temple or tomb, is carefully described in such a way that the reader may appreciate fully the characteristic features of each. The sites in the Delta, usually neglected by the visitor, here receive the attention which is their due in view of their importance in the history of Egypt. The account of the antiquities housed in the Egyptian Museum will be helpful in guiding the layman to the more significant exhibits, among which those from the tomb of Tutankhamen naturally take pride of place. The book is well illustrated and has an adequate provision of the plans necessary for study of the temples and tombs.

Watchings. By W. R. CALVERT. (Putnam. 6*s*.).

This book, a record of the author's observations of birds, beasts and reptiles, takes its title from the Biblical phrase, "in watchings often." Its appeal is both popular and scientific. Many books of this type are published nowadays, and this is one of the best that has come to our notice. It is written in the form of short sketches or stories which will attract the unscientific nature lover, and at the same time there is on almost every page some piece of observation or out-of-the-way lore which will reveal to the specialist that the author is a skilled and erudite naturalist.

The scope of Mr. Calvert's sketches is very wide. They include hen harriers toying in the air, water shrews and water voles fighting, badgers grubbing out and consuming wasps' nests regardless of their stings, great spotted woodpeckers eating seeds of fir-cones, buzzards driven off by ravens from carrion and long-tailed tits sleeping in a pyramid. He knows the sparrow-hawk's method of plucking its prey, and how a blackbird scratches its head by bringing its foot back behind and then forward over its wing—a trait which we have observed on our own lawn. He has seen a kestral catch a swallow, and an adder strike at a lizard but only secure its discarded tail, and has remarked the nuthatch's sagacity—surely acquired by experience—in rejecting an unsound nut. The cock bullfinch, he tells us, feeds his mate by regurgitation, a pleasant habit which he shares with the male greenfinch.

It is doubtful, he says, whether there are any polecats left in the Lake District to-day: they certainly survived up to a few years ago. We are glad to learn that the pine marten still survives, but it is disgusting to be told that when run to earth by hounds it is sometimes smoked out. Even when so maltreated it often escapes, but surely sportsmen worthy of the name might leave this extremely rare and interesting creature alone.

Mr. Calvert speaks of the gannet's eyes as pale yellow, and in this he is supported by at least one good naturalist who examined a dead bird. But recent observation of living gannets at a distance of only a few feet convinced us that their eyes are not yellow but translucent grey.

Many of the sketches end in tragedy. This is true enough to nature, but the result is a certain sameness. Still, we must not quarrel on this account with a good book which we have enjoyed, as many others will. It should have had an index.

The Tomb of Tut-Ankh-Amen. Vol. 3. By HOWARD CARTER. (Cassell. 18*s*.).

With this volume Dr. Carter completes his preliminary account of the tomb of Tut-ankh-Amen, discovered by the late Lord Carnarvon and himself in the Valley of the Kings in Egypt—a discovery which aroused and held public interest in archaeology to an unprecedented degree. Owing to its scientific and intrinsic value, moreover, it was to a great extent responsible for the more exigent conditions subsequently imposed upon archaeological exploration by the Egyptian authorities.

Dr. Carter now describes the contents of two small chambers which he has termed respectively the "Innermost Treasury" and the "Store Room," the former adjoining the Burial Chamber, the latter the Ante-chamber. The contents of both were of a miscellaneous character, which made it difficult at first sight to determine the functions of the two chambers in the funerary ritual. The disorder of their contents was due in part to an original miscalculation of the space available for the funerary offerings—a feature, as Dr. Carter points out, in some degree common to all royal interments — and partly to the rough handling to which the contents of the tomb were subjected by robbers in ancient times. The damage was repaired in part only when the tomb was resealed. The tomb would appear to have been rifled twice, once for precious metals, and once for the valuable unguents which had formed the original contents of the Store Chamber. No attempt had been made to reduce the contents of this room to any sort of order, and it was crammed to the doorway with a miscellaneous jumble in which beds, chairs, chests which had contained clothes, jewellery, etc., and personal property of the deceased monarch such as the playthings of his youth, were piled in a confusion from which they were disentangled only by the long and patient labour of the excavator.

In the Inner Treasury the offerings, though heterogeneous, showed some evidence of arrangement. The central object, giving meaning to the chamber, was a chest or shrine in which were the four Canopic jars containing the viscera of the king. The personal character of so much of the contents of these two chambers gives a special interest to this volume in the more intimate glimpse it affords of the character of this previously little-known king and the atmosphere in which he lived. Further it throws light not only on many details of Egyptian funerary ritual, but also on the reversion of the royal court from the Aton heresy to the traditional form of the official religion, which is symbolized in the resumption of the 'amon' element in the king's name.

Dr. Carter has incorporated in his text a number of discussions of questions of broader import, of which not the least valuable is an analysis of the evidence for the length of reign and age of the later monarchs of the XVIIIth dynasty.

In the Mountains of Greece. By H. A. F. KITTO. (Methuen. 6*s*.).

Mr. Kitto and his wife spent a long summer in wandering over the hills of Central Greece and the Peloponnesus and thoroughly enjoyed their unconventional tour. His charming and witty book enables the reader to share the fun of camping out so as to see the temple of Bassae by moonlight, or of a village wedding, or of escorting a pig-dealer through the museum at Olympia, or of discussing Epaminondas with a miner, or of staying in a remote hillside monastery where they had preserved walnuts. Mr. Kitto, for all his assumed modesty, is a Greek scholar of repute and able to converse with all and sundry in the modern tongue. He thus gives an accurate and lively picture of the kindly folk of rural Greece who see few foreigners except an occasional archaeologist and retain their simple traditions, especially where they are not overawed by Greeks who have returned from America with a little money, a little English and a vast amount of self-conceit. It is interesting to find that Mr. Kitto was most deeply impressed by the inconspicuous remains of ancient Sparta. "I had since early childhood stood patiently and with ever-decreasing expectation upon dozens of famous sites, but the layers of History beneath me never penetrated the soles of my boots until I planted them on this mound. Here, suddenly, unexpectedly, I was moved almost to pain and I came away from the spot as from a solemn music." Mr. Kitto's route led him first up into Aetolia and down to Missolonghi, thence by Patras and Pyrgos and by coasting steamer to Gythion, the port for Sparta, and up through the centre of the Peloponnesus to Corinth and Athens. He evaded most of the well-known sites but he was well rewarded for his unconventionality, as this most attractive little book shows.

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